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MOTOR AGE

FLORIDA BEACH RACE UP-TO-DATE

Fastest Times Made at Standard Distances By Motor Cars Over the Ormond-Daytona Sand, From 1903 to the Present—What the Flyers Have Done in Battle with Father Time

1903

Distance	Car	Time
1 mile	Winton	:52 1-5
5 miles	Winton	7:23
10 miles	Winton	10:26

1904

1 mile	Mercedes	:39
5 miles	Mercedes	3:13 3-5
10 miles	Mercedes	6:50
50 miles	Mercedes	40:49 4-5

1905

Distance	Car	Time
1 mile	Napier	:34 2-5
5 miles	Napier	3:17 2-5
10 miles	Fiat	6:54 4-5
50 miles	DeDietrich	38:51
100 miles	DeDietrich	1:18:24

1906

Kilometer	Stanley Steamer	:18 2-5
1 mile	Stanley Steamer	:28 1-5
2 miles	Darracq	:58 4-5
5 miles	Darracq	2:34
10 miles	Napier	6:15
100 miles	Napier	1:15:40 2-5

1907

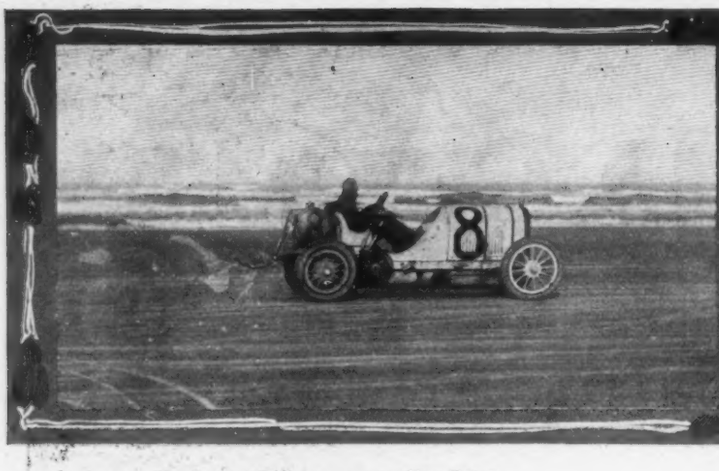
Distance	Car	Time
1 mile	Stanley	:31 4-5
5 miles	Stanley	3:44 4-5
100 miles	Am. Mercedes	1:26:10

1908

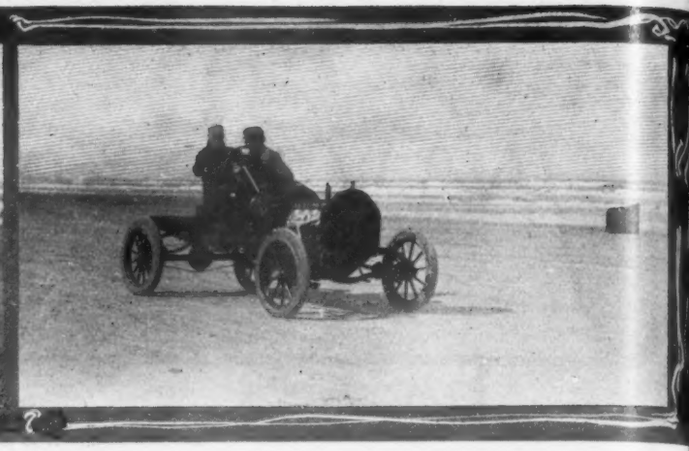
1 mile	Fiat	:35
100 miles	Renault	1:12:56 1-5
150 miles	Benz	2:40:33
250 miles	Fiat	3:16:48 2-5
300 miles	Fiat	3:53:44

1909

1 mile	Benz	:33
10 miles	Benz	5:14 2-5
100 miles	Buick	1:34:00 1-5



BRUCE BROWN IN THE BIG BENZ



HERBERT LYTLE AT WHEEL OF THE CADILLAC

DAYTONA, FLA., March 27—The seventh annual Florida beach tournament now is a matter of history, the meet winding up last night. The attendance of the general public was not large and entries were few, but the field was small but classy.

To the 120-horsepower Benz belongs the first honors of the meet. It went out of commission with a broken piston at the conclusion of the second day, but not until David Bruce Brown had set a new world's mark in the amateur class for the mile of :33, and had beaten the professional competition record for 10 miles with 5:14⅖, at the rate of 114 miles per hour. George Robertson piloted the Benz in one race, the 5-mile invitation, and set a new competitive mark of 2:45⅕.

Lewis Strang's victory in class D was well earned, and his new mark of 1:34:00⅕ for 100 miles is a stock car competitive record.

The riders of the two-wheeled motor-driven machines have every reason to look with pride upon their achievements. Premier honors went to Walter Goerke, of Brooklyn, riding an Indian, who on Wednesday in the 5-mile straightaway trials reduced the record to 3:30⅕ for that distance. This was followed on Thursday by another successful onslaught on the record table by Goerke, his first performance being a lowering of the kilometer mark to :27⅘, and his second the winning of the 1-hour record race for motor cycles, in which he clipped a large slice off the Brooklands track record of 68 miles 1,380 yards traveling 69 miles in 58:25⅘.

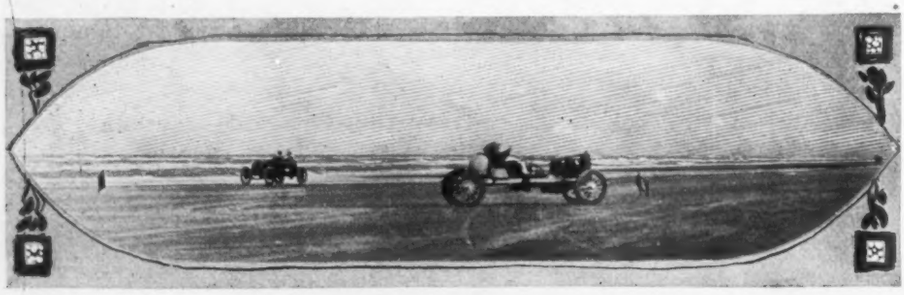
Formal announcement was made on Thursday that the eighth annual tournament will be held next January, probably during the last week of the month.

Thursday's program of motor car events promised to go by the board, after the disaster to the Benz's piston. Work was continued all Wednesday night to make repairs, but there were not sufficient mechanical facilities to get the car into working order and as Kilpatrick's Hotchkiss was still out of commission, the Fiat Cyclone had a walkover in the 1-mile invitation. De Palma drove over the course in :37⅖. As the Buick team left town early in the morning to attend the hill-climb at Atlanta on Saturday, the management became busy and organized two 4-mile handicap events with impromptu entries. These races proved to be the most interesting of the meet in a competitive sense. Start was made at the tape, and the course was 2 miles south and return. Inglis M. Uppercue, of New York, won the first handicap in a 30-horsepower Cadillac, with a handicap of 1 minute 5 seconds, in 5:03⅖; M. Hotchkiss, 30-horsepower Pope-Hartford, with 50 seconds handicap, was second, and Seamans, 30-horsepower Stoddard-Dayton, 30 seconds handicap, was third. The second handicap resulted in a win for the Pope-Hartford, after its handicap had been reduced to 30 seconds, in 5:05⅗; de Palma, driving the Fiat Cyclone from scratch, was second, in 3:16—net time—and Seamans, Stoddard-Dayton, 30 seconds, was third.

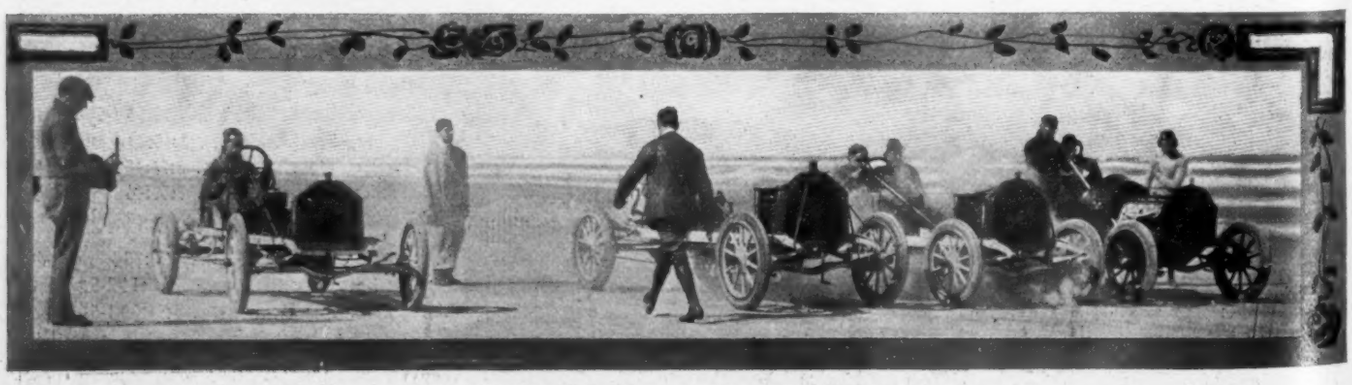
Story of the Present

Last Day of Racing

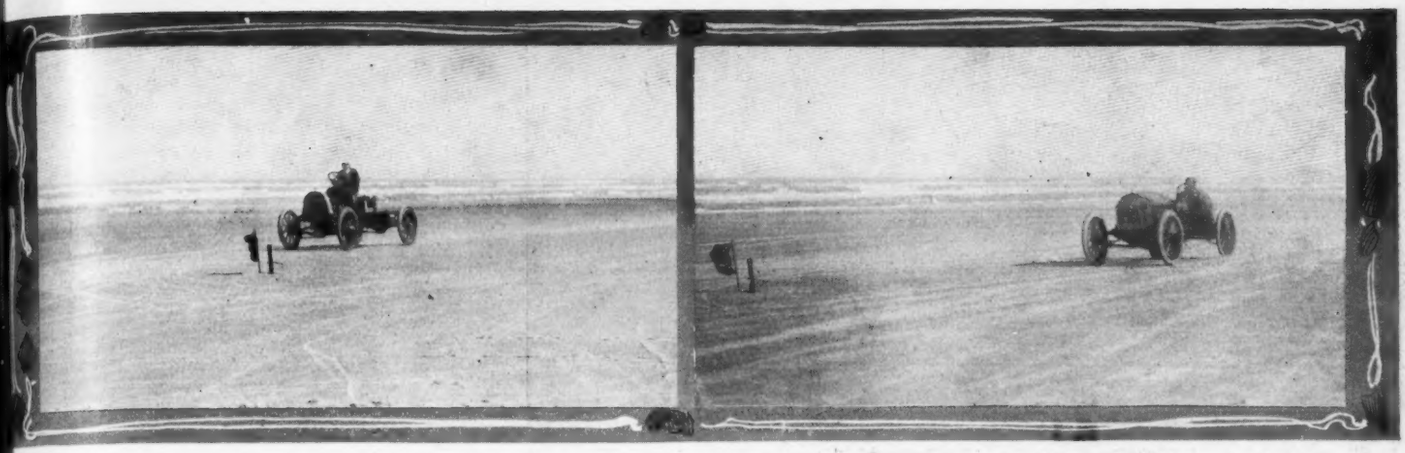
The program for Friday consisted of the excess of numbers on the program that had



TURN IN 200-MILE RACE, LOUIS STRANG LEADING



CARS LINED UP FOR START OF THE 50-MILE RACE



POPE-HARTFORD ARRIVES AT A TURN

DE PALMA IN THE FIAT CYCLONE, TRAVELING FAST

and Past Tournaments

been crowded out from the previous days of racing. The event of importance was the 100-mile race for the Minneapolis trophy, which had to be won twice to insure its permanent possession. Last year the late Cedrino piloted the Fiat Cyclone to victory in this event, and this year Ralph de Palma was at the wheel in the same car to secure a second and final hold on the trophy. As it was he had a walkover, as no other competitors lined up at the tape. He did not go after the 100-mile record, but drove a limited distance over the course, under the instructions of Referee Miles, who awarded him the race. De Palma also had a walkover in the 1-mile invitation.

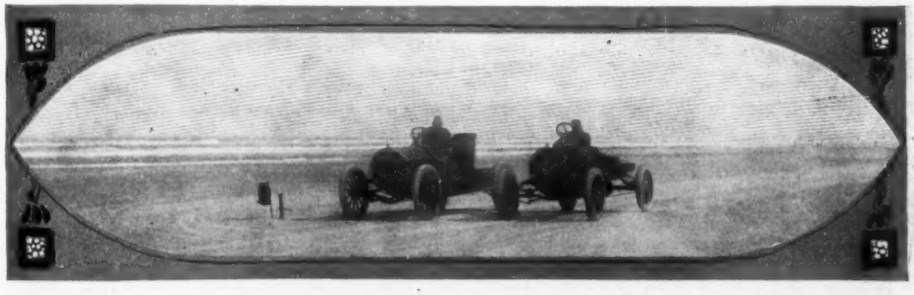
An 8-mile handicap, 4 miles out and return, brought out a field of eight starters. De Palma at scratch won handily in 8:45—net time. He was followed over the tape by the Hotchkiss Pope-Hartford, which won considerable glory as a persistent starter and finisher.

History of Beach Racing

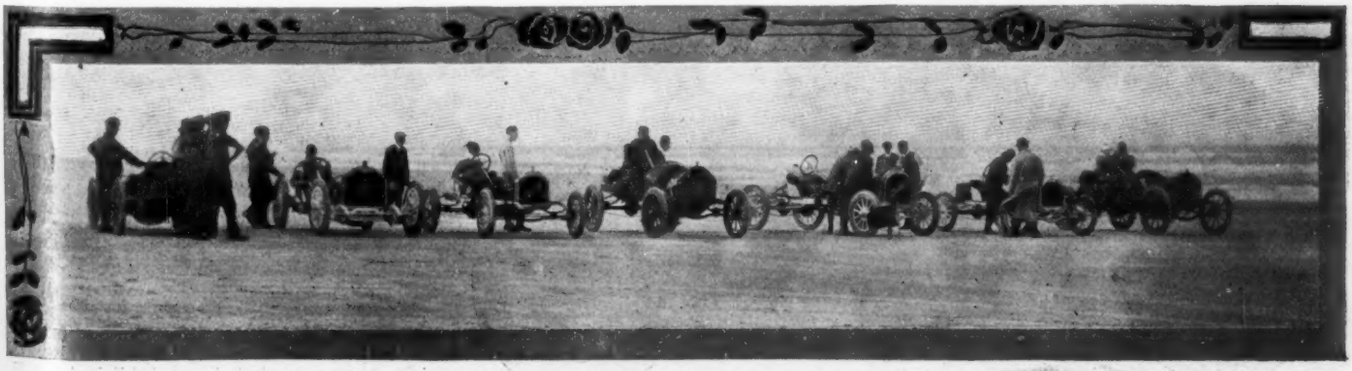
Beach racing has been popular in this country since 1903 when the first meet was held at Ormond when Alexander Winton in the Winton Bullet demonstrated the possibilities of a sand course by turning a mile in :52⅕, slow in comparison with the wonderful times made nowadays, but at that time 68.9 miles per hour was considered fast traveling. Ormond, however, has not enjoyed a monopoly of this sort of racing, there having been held since the inauguration of the Florida tournaments, meets on three other beaches, none of which produced anything near so sensational speed as the mile by Marriott in :28⅕ at Ormond in 1906. Atlantic City, N. J., has held three beach meets, one in 1905 and two in 1906. The fastest mile recorded there was :34 by Christie in his front driver in an official time trial. Hilliard in an 80-horsepower Napier also created a standing mile record of :53 at Atlantic City in 1906. Cape May ran two meets in 1905, the best time there being a mile in :38 by A. L. Campbell in a Darracq, while Christie has a :39⅕ to his credit. Meets were held on Sachuset beach at Newport in 1904 and 1906 but they were local in character and no fast time was made.

The peculiar conditions that exist at Ormond-Daytona apparently are not found at the other beaches, which never have been able to equal the speed which has been shown at Ormond, which has to its credit the greatest flight ever shown on any course in the world, even excelling the famous Brooklands track in England. Marriott's mile in :28⅕ in 1906 was equal to 127.6 miles per hour and the closest approach to it is the reputed 121 miles per hour pace for one lap by Nazzaro in a Fiat at Brooklands.

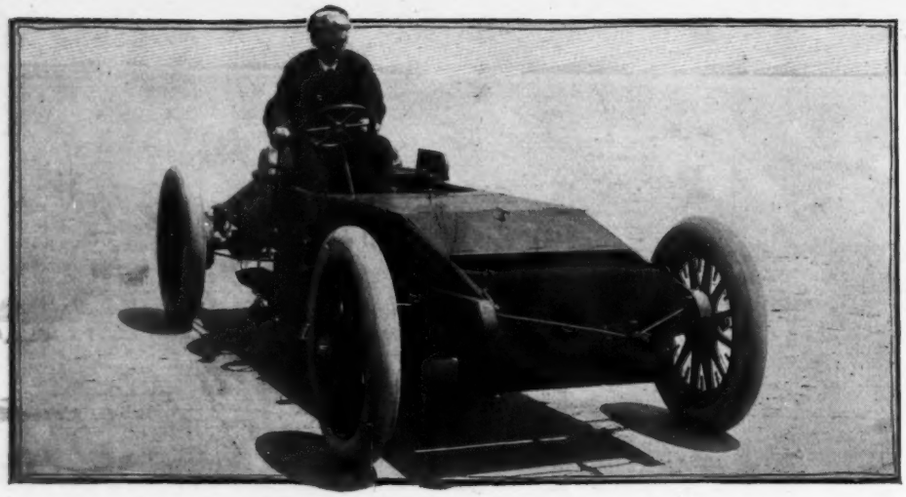
Ormond was at the zenith of its fame in 1906 when there was such a wholesale slaughtering of records, but probably the most successful of all—from the amateur point of view at least—was in 1904 when the meet extended over a week and attracted such amateur stars as Vanderbilt, Bowden, Wallace and others, at which time Vanderbilt made his mile in :39, an amateur record which stood until last year when it was beaten by Bruce Brown.



LOCOMOBILE AND CADILLAC ROUNDING THE FLAG



SEVEN START IN THE LONG DISTANCE RACE ON WEDNESDAY



ALEXANDER WINTON IN THE WINTON BULLET OF 1903

The Dewar trophy for the mile and the Minneapolis cup for the century have always been prominently identified with the sport at Ormond, and the recent meet finally settled the ownership of the two. The Minneapolis cup was put up by the Minneapolis Automobile Club and was first competed for in 1906 when Clifford Earp, driving a 100-horsepower Napier, won it in 1:15:40 2-5. In 1907 the field was not so brilliant and the winner turned up in E. Blakeley, driving a 70-horsepower American Mercedes, who made the century in 1:26:10. Last year Emanuel Cedrino, who was killed training for a track meet at Baltimore last summer, landed the cup for the 60-horsepower Fiat Cyclone, his time being 1:50:20. This time the Fiat again scored, the driver being de Palma.

The Fiat also gets the Dewar trophy, which in the past has been held by Louis Ross with a Ross steamer and Fred Marriott with a Stanley steamer. Ross won it in 1905 with a mile in :42, beating MacDonald in the Napier, who had :42⅖, Marriott, driving a 30-horsepower Stanley, won with :33 in 1906, beating Cedrino, who piloted the 110-horsepower Fiat and who made the mile in :37.

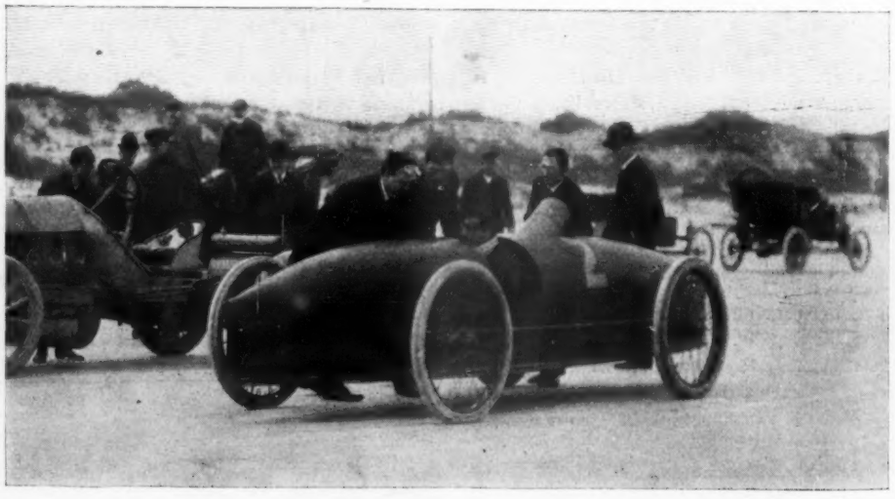
First Meet in 1903

The first Ormond meet was held March 26, 27 and 28, 1903, and being a decidedly original idea it attracted a big crowd of motorists, among them being several of the leading manufacturers. Alexander Winton and his Winton Bullet of course were the star attractions, it being the ambition of the Cleveland manufacturer to beat the straightaway mile record of :51⅘, made by Fournier in a Mors. At that time the world's record was :46, made by Augieres in a Mors. Winton made several trials and succeeded in getting to :52⅕, which stood as a record for an American-built car. The Oldsmobile racer, weighing only 825 pounds and driven by a 10-horsepower double opposed horizontal engine, made its debut and succeeded in making the mile in 1:06⅕ and the kilometer in :42, the driver being H. L. Thomas.

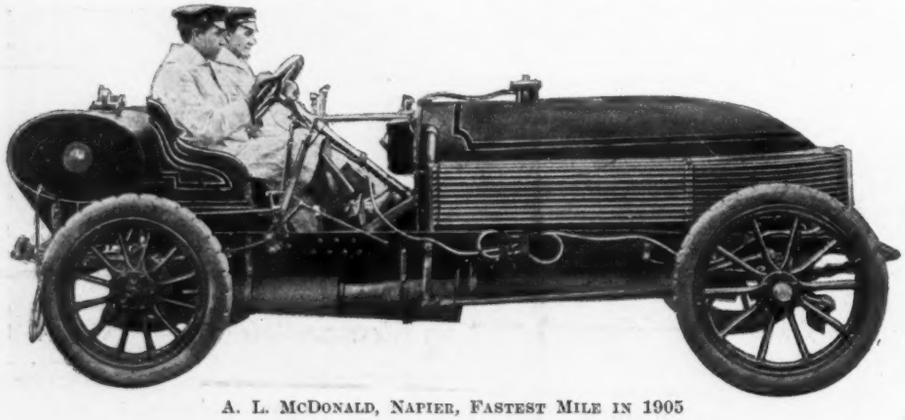
So enthused did the motoring public become over Ormond that the following year, 1904, an elaborate program was mapped out, extending throughout the week of January 27-February 3. It attracted all the notables and as a result there was a big record crop. W. K. Vanderbilt, Jr., driving a 90-horsepower Mercedes, turned the mile in :39, the 5 miles in 3:31⅘, 10 miles in 6:50, 20 miles in 17:02, 30 miles in 24:[illegible] and 40 miles in 33:52⅖ and 50 miles in 40:49⅘. The only other man to figure on the record slate was H. L. Bowden, who did 15 miles in 10:18 in a 60-horsepower Mercedes.

Bowden's Two-Engine Car

Bowden turned the tables on Vanderbilt in 1905 when he went south with his Mercedes which was credited with 120 horsepower because of the two engines which he had coupled together. In this Bowden turned a mile in :32⅘, but the credit went to A. L. MacDonald, the Englishman who piloted the 100-horsepower Napier a mile in :34⅖. Putting the two engines in, Bowden exceeded the maximum weight of 2204 pounds, so his record was not allowed. Among those who also had a hack at the mile record were Louis Ross in his Ross steamer, who did :38; Walter Christie in the Christie, :42⅕; W. K. Vanderbilt, Mercedes, :42⅖; Guy Vaughn, Decauville, :48⅕, and Webb Jay, White, :53. Barney Oldfield and his Green Dragon also was a competitor in the races. Henry Ford, too, was there with a six-cylinder Ford with a 6 by 6-inch motor, the car weighing 1,400 pounds. It was expected Ford would make sensational time over the beach, but unfortunately he broke a crankshaft while tuning up and not having an extra one with him he was forced to give up his record ambitions. It was at this meet that the 100-mile record got its first bad beating, a new mark being established by H. W. Fletcher, who drove an 80-horsepower



MARRIOTT IN THE STANLEY THAT DID MILE IN :28 1-5 IN 1906



A. L. MCDONALD, NAPIER, FASTEST MILE IN 1905

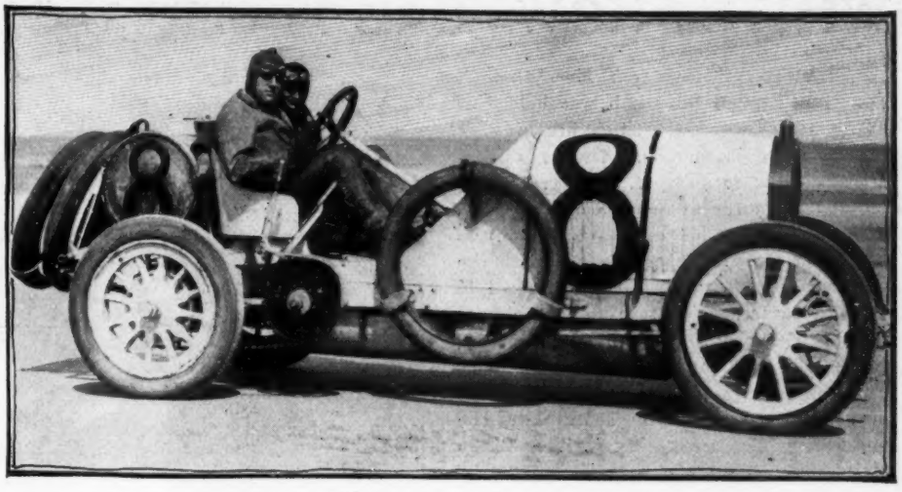
de Dietrich to victory in the W. K. Vanderbilt, Jr., cup race. The race was run with seven turns and without controls, yet Fletcher managed to make the century in 1:18:24, which was at the rate of 76.5 miles per hour. As a comparison it might be mentioned that the American road record at that time was 2:52:00, made by Emile Voight in a Panhard on Long Island.

Banner Tourney in 1906

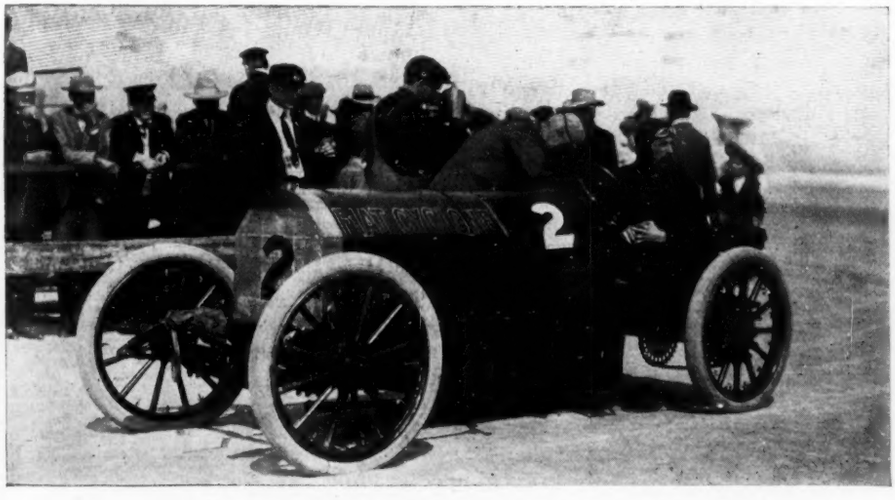
Without doubt the meet of 1906 produced more excitement than any one of the tournaments run over the Florida sands, for it was at this time that a record was established for the mile that has stood ever since and which bids fair to last for a couple of more years at least. It was Marriott in a 50-horsepower Stanley steamer who turned the trick in :28⅕, which meant 127.66 miles per hour, a pace that is only topped by an electric trolley car, which is credited with having shown 128.55 miles per hour in Germany. It was at this time also that Earp won the Minneapolis cup event, establishing a new 100-mile record of 1:15:40⅖. Next to Marriott's effort, however, was the successful attempt to crowd 2 miles into the minute for the gold speed crown. Victor Demogeot, of France, driving the 200-horsepower eight-cylinder Darracq, was the hero of the affair, the 2 miles being covered by him in :58⅘. Demogeot had been substituted for Hemery, who had sulked, and in scoring his victory he defeated Marriott, who, however, also beat the time limit, doing :59⅗. Each car had two trials. The first time Marriott did :63 and Demogeot :61⅗. Marriott then cut it to :59⅗, thus becoming the first man to do 2 miles inside the minute. His joy was short-lived, however, for when the Darracq made its trial Demogeot carried it through in :58⅘.

Racing Frost in 1907

The tournament of 1907 was in the nature of a frost. It was held the latter end of January, conflicting with the show dates, and the entry list was a skimpy one. In fact, so poor was the racing that it seriously was debated whether or not it was advisable to continue the annual tournaments. In a racing way the most interesting event was the century grind for the Minneapolis cup, which, however, failed to produce a new record. It also was at this meet that Marriott had the most narrow escape of his career and which caused his retirement from beach racing. Marriott came out in the Stanley to attack his :28⅕ and after a couple of trials he finally got the word. It looked as if he would succeed, for he crossed the starting tape going like a bullet from a gun. No sooner had he passed, though, than the car bounded into the air, skidded and then rolled toward the ocean. The explanation of the accident was that in clearing a small gully or rough spot the car leaped into the air and turned sidewise, crushing its wheels and turning over. Marriott luckily escaped with a few bruises and no broken bones.



BRUCE BROWN IN BENZ, BEST MILE IN 1909



THE LATE EMANUEL CEDRINO IN THE FIAT CYCLONE

Cedrino's Fast Work

Long distance racing came in for the greatest prominence at the meet of 1908, held the first week in March. The Automobile Club of America undertook the promotion of the affair, but again there was a dearth of entries. The cars that were there, however, made several pages of motoring history. Probably the most sensational record was that established by Maurice Bernin in a 60-horsepower Renault in a match race with Stevens in the Fiat Cyclone. Bernin put up 1:12:56⅕ for 100 miles, which averages 82.26 miles an hour. Cedrino in the Fiat also came into the limelight by averaging 77.02 miles per hour for 300 miles in the 256-mile race for the A. C. A. cup. At 250 miles Cedrino had broken the record with his 3:16:48⅖, so he kept on for the triple century. In the mile trials Cedrino and the Fiat again shone with distinction, the best time, :35, being made by him, while Bruce Brown, an amateur, driving the Fiat, did :35⅗.

1906	FRANK MARRIOTT ~ STANLEY STEAMER ~	127.6 MPH
1907	FRANK MARRIOTT ~ STANLEY STEAMER ~	113.2 MPH
1909	BRUCE BROWN ~ 120-horsepower BENZ ~	109 MPH
1905	ARTHUR MACDONALD ~ 90-horsepower NAPIER ~	104.6 MPH
1908	E. CEDRINO ~ 60-horsepower FIAT ~	102.8 MPH
1904	W. K. VANDERBILT JR. ~ 90-horsepower MERCEDES ~	92.3 MPH
1903	ALEXANDER WINTON ~ BULLET ~	68.9 MPH

CHRONOLOGICAL CHART OF MILE TRIALS IN FLORIDA TOURNAMENTS

WHITE SHOWS GREAT SPEED ON ATLANTA HILL

ATLANTA, GA., March 29—Atlanta's third annual hill-climb was held Saturday afternoon, amid much breaking of records and a vast amount of what is popularly referred to as eclat. The fracturing of all past marks in the size of the crowd and the number of entries and starters amounted to little in comparison with the new mark set for the hill by a model K White steamer, which tore up the Stewart avenue incline, 9-10 mile in length, in :45⅘ seconds, or at a rate of 70 miles per hour. This was so far below the old hill record of :51⅕ and so close to what appears the possibility of the hill that it is liable to stand for awhile.

Crowds at the Climb

The start of the climb was set for 1 o'clock, which rather awkward hour increased rather than diminished the size of the crowd, for it furnished an excuse for basket lunches and a general picnicking in the woods that line the course on both sides, which excuse was not overlooked by several thousand people. That many of these people walked the 2 miles from the nearest car line seemed to matter but little in their enjoyment. In all probably 5,000 saw the climb, which is fully 2,500 above past marks. There were forty entries in the climb and twenty-eight starters.

The program was well graded, starting with a motor cycle event and ending with the free-for-all, which has been the topic of conversation, argument and wagering for weeks past. Six cars were entered for the free-for-all trophy, but "cold feet" and similar constitutional causes resulted in the withdrawal of all but two, a Stearns six, owned by Ed Inman, and a model K White steamer, which is the first that has ever taken part in the Atlanta climb.

The White car, familiarly known as the Whistling Billy, in fond remembrance of the White Whistling Billy of other days, was the first away in the race, and it boomed and groaned up the course in handsome style. Unfortunately the timing apparatus suffered a relapse after the car started and the official watch did not catch the time. The watches used as a check on the big timer showed :45⅘, however, and, after some argument this was accepted.

GENERAL VIEW OF ATLANTA HILL FROM STARTING LINE

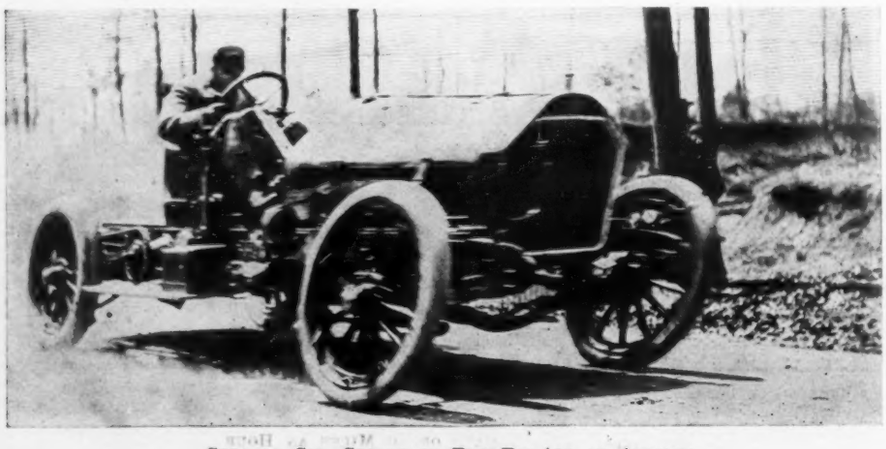
The Stearns started second and made a brave attempt to cut the White's time. For the last half of the hill there is no doubting but that the Stearns had the better of it, and it went over the brow of the hill and down the other side at a rate never before equaled on the hill. But the White had had the advantage at the start and covered the course in 2⅗ seconds better time than its gasoline rival.

Other Events Interesting

Though the free-for-all was the big spectacular affair of the afternoon, the other classes were of great interest. In the first class, for $900 and less, a 1908 Buick proved the winner, in 1:15. Another Buick was second and two Fords, one a runabout and the other a touring car, performed the unique feat of getting up the hill in exactly the same time, 1:23, and tying for third place. Class 2 had the most starters and an E-M-F, well handled by Jones, was first in 1:08. Buicks were second and third. Jones also drove the winner in class 3, for touring cars costing $3,000 or under, but in that event it was a Pope-Hartford. Another car of the same make was second and a Buick third.

Then the Buick string, rushed up from Daytona for the event and handled by Strang and Burman, began to take notice. In class 4, the runabout brother to class 3, Lewis Strang sent his Buick up in :58⅗, winning by a safe margin from a fast field. It was up to Burman to uphold the honors of the Buick stable in the fifth class, for touring cars costing $5,000 or less, and he did so ably, winning in 1:04⅘ from two Pope-Hartfords. The sixth class was called off on account of a scarcity of starters. In its place Strang drove an exhibition heat, in an attempt to lower his mark of :58⅗, but an even :59 was the best he could do.

After the climb there was a flurry of protests. Both the Buicks driven by Burman and Strang were protested on the grounds that they did not carry dust pans as provided in the catalogued list of equipments, and that they were otherwise outside the stock car pale. The record-breaking White was protested on the charge that it was not strictly a stock car. The protest against Burman's car was withdrawn later, while that against Strang was referred to the A. A. A. The protest against the White was not allowed by the contest committee.



STEARNS CAR, SECOND IN FREE-FOR-ALL AT ATLANTA

NORRISTOWN RUN PLANS

Norristown, Pa., March 29—At last Thursday night's pow-wow many of the preliminaries of the Norirstown Automobile Club's 2-day endurance run to Hagerstown, Md., May 18-19 next, were settled. Checking stations will be located as follows: First day—Coatesville, 30 miles; Lancaster, 54; York, 81; Hanover, 107; Frederick, Md., 151; Hagerstown, overnight stop, 177. Second day—Gettysburg, 34 miles; Chambersburg, 60; Harrisburg, 111; Reading, 167; Pottstown, 187; Norristown, 207. The round trip will cover 384 miles. Entries will be divided into two groups—one consisting of manufacturers and others interested in the trade, the other of laymen. The latter group will be sub-divided into class A, for contestants who will check in on time schedule only

and who will carry official observers; and class B, for A. A. A. or Pennsylvania Motor Federation members, who will only be required to check out at the start and in at the finish on both days. A big bunch of scouts, led by Tom Berger in an Oldsmobile, will start over the route next Wednesday at sunrise to make arrangements for hotels, checkers, etc.

MICHIGAN ROAD REPORT

Lansing, Mich., March 29—State Highway Commissioner Horatio S. Earle has submitted a report showing the work on roads since the department was inaugurated in 1905. There is still a balance in the expense fund of $11,060. In 1905 the legislature appropriated $20,000 for state award and $10,000 for department expenses. In 1906 the amount was $50,000 state award and $10,000 expenses. In 1907 the amount for state award was $100,000 and for expenses $10,000. Last year the amounts were: State award, $150,000; department expenses, $1,000. In the 4 years the totals were: State award, $320,000; department expenses, $40,000. The state award money is paid to townships under the good roads system, the state paying so much for every mile of road constructed. In the 4 years 332 road institutes have been held, the total cost to the various counties being $4,980. Road maps have been made of every township in the state at a total cost of $1,200. The changes in road laws have been published and have been sent to highway commissioners at a total cost of $500. The salaries of the department for the 4 years have totaled $28,000.

Cheyenne Will Build a 5-Mile Motor Race Track

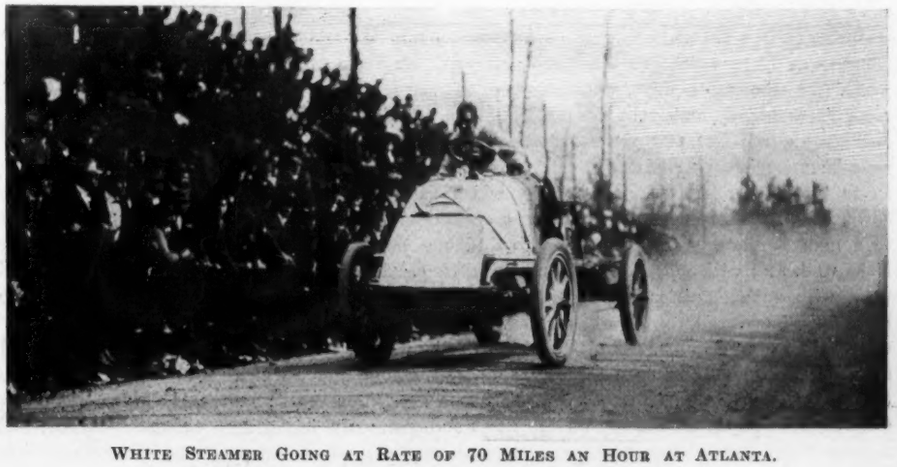
Cheyenne, Wyo., March 26—Cheyenne is to have a 5-mile motor race track, 80 feet wide, without steep grades or dangerous curves, on which the fastest cars in the country may let themselves go to the limit. This track when completed will be one of the few of its kind in the country and will be the only one of its sort west of Chicago. The civil improvement committee of the City Industrial Club is fathering the deal, and already the amount of money necessary has been subscribed. The track will embrace a 5-mile course which will begin and end at the grand stand at Frontier park. It will be laid in a huge circle out around the lakes east and north of the grand stand and a particular feature of the project is that the course will be laid upon high ground and the racers will be visible at all times from every part of the stand. The cost of construction is amazingly small, the level character of the ground and the gravelly soil making it possible to complete the course at an outlay of less than $1,000. The soil is of such a character that dust will be practically unknown, even in the driest weather, and the splendid summer climate of Cheyenne will add greatly to the attractiveness of the course for long and short-distance races. An annual race meet in Cheyenne will probably be the outcome of the project and it bids fair to become as popular in the "Magic City" as the renowned Frontier show. It is possible, however, that one may be used to increase the interest of the other, for the Frontier committee is already planning for three big races of 25, 50 and 100 miles respectively on the three coming frontier days of August 26, 27 and 28.

POPE RECEIVERS DISCHARGED

Hartford, Conn., March 29—Albert L. Pope and George A. Yule, receivers of the Pope Mfg. Co., have filed a final accounting with the clerk of the superior court and have petitioned for their discharge. The receivers were appointed in August, 1907. The property of the corporation in this state was conveyed on November 20 last to the new corporation, the Pope Mfg. Co., of Connecticut. All claims against the old concern have been fully paid, with interest, and the company dissolved by a decree of the court of chancery in Newark, N. J. All the administration expenses, except the costs of the court, have been paid by the domiciliary receivership, or the new corporation, except the claim of the town of Hartford for taxes on the list of October, 1908. The amount of taxes, not yet due, and disputed in part, is about $16,000. The Pope Mfg. Co. of Connecticut is now in possession of the property and has agreed to pay the above mentioned claims. The receivers have also asked permission to transfer to the Pope Mfg. Co. all sums in their hands within the jurisdiction of this court. Judge Silas Robinson accepted the final account rendered by Messrs. Pope and Yule and discharged the receivers.

SUMMARY OF HILL-CLIMB AT ATLANTA, GA., HELD MARCH 27.

Name of car	H.P.	Cyl. bore	Piston Stroke	Car Model	Driver	Time
CLASS 1—CARS COSTING $900 OR LESS						
Buick	18	3¾	4	Model 10, 1908	Travis	1:15
Buick	18	3¾	3¾	Model 10, 1908	Cantrell	1:21
Ford	20	3¾	4	T Roadster	Huie	1:23
Ford	20	3¾	4	T Touring Car	Brown	1:23
Lambert	18-20	5	4	A 1	McNeal	1:49 4-5
CLASS 2—CARS COSTING $1,500 OR LESS						
E-M-F	30	4	4½	Runabout	E. J. Jones	1:08
Buick	18	3¾	3¾	Model 10, 1909	Chalker	1:11 1-5
Buick	18	3¾	4	Model 10, 1908	Travis	1:14
Buick	18	3¾	3¾	Model 10, 1909	De Witt	1:14 2-5
E-M-F	30	4	4½	Touring Car	Atkins	1:15 1-5
Ford	20	3¾	4	T Touring Car	Brown	1:21 1-5
Chalmers-Detroit	F 30	3⅞	4½	F	Smith	1:22 1-5
Lambert	25-28	4	4	30	McNeal	1:24
Ford	20	3¾	4	T Roadster	Huie	1:28 1-5
Overland	30	4	4½	30	C. E. Stewart	1:29 2-5
CLASS 3—TOURING CARS COSTING $3,000 OR LESS						
Pope-Hartford	40	4 5/16	5½	S	E. J. Jones	1:04 4-5
Pope-Hartford	30	4⅛	5⅛	L 1907	Stoddard	1:05 1-5
Buick	30	4½	5	17	Burman	1:08
Selden	30	4¼	4½	20	H. M. Woodom	1:19
CLASS 4—RUNABOUTS COSTING $3,000 OR LESS						
Buick	30	4½	5	16	Strang	:58 3-5
Stevens-Duryea	24	4¾	4½	3xR	Henderson	1:02
Ford	40	4½	4¼	K Roadster	Huie	1:05 4-5
Maxwell	30	4¼	4¼	K A		1:15 2-5
CLASS 5—TOURING CARS COSTING $5,000 OR LESS						
Buick	30	4½	5	17	Burman	1:04 4-5
Pope-Hartford	30	4⅛	5⅛	L 1907	Stoddard	1:05
Pope-Hartford	40	4 5/16	5⅛	S	Jones	1:06
EXHIBITION						
Buick	30	4½	5	16	Strang	:59
CLASS 7—FREE-FOR-ALL						
White steamer	30	3 h. Pr. 6 L.	4½	K	Lambert	:45 4-5
Stearns	45-90	5⅝	5⅞	6-cylinder, 1907	A. H. Almond	:48 2-5



WHITE STEAMER GOING AT RATE OF 70 MILES AN HOUR AT ATLANTA.

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The Empirical in the Motor Car Field

AMONG the ancient Greek physicians was a class designated *empirics*, whose knowledge of medicine was founded solely on what they had gained from practice and experience. This class contrasted strongly with those Greek physicians whose knowledge was based on the science and theory of medicine. The *empirics* depended on experience and observation alone, without due regard to science and theory and deviated from the rules of science and practice in many respects. At that time the better classes of the populace applied to these *empirics* equivalents to the present terms of quacks and charlatans. In the philosophical world, the term empirical, which is derivative from *empirics*, means solely what belongs to, or is the product of experience and observation. From *empiric* has arisen an army of derivatives such as empirical, empirically, empiricism, empiricists, and empiristic, all of which agree in referring to knowledge obtained solely from observation and experience, and in which the scientific reason for such is entirely set aside and which frequently deviates from what has been declared correct by scientific research.

IN the motor car industry today there is a vast wave of empiricism. The wave is not so high or formidable as it was 2 years ago, at which time the empirics were numerous, but thanks to the brains of a large percentage of the American-buying public, many of these have had the curtain rung down on them and are today but memories. One concern that was, but fortunately is no more, in determining the diameter of the cylinders, the length of the stroke, the diameter of the valves and the lift of them, arrived at its conclusion by averaging these measurements on five other makes of cars manufactured in the same state, and which measurements were wholly without regard to the other parts of the car. It is scarcely correct to term this empiricism. It is worse, and might justly be designated sub-empiricism, in that the conclusion were based solely on observation, without experience serving as a factor. The manufacturers of this nature, unfortunately, are not as yet all extinct. The empirics still exist in nearly every state in which cars are being manufactured. In some the empiricism is in conjunction with the motor design; in others, in connection with the clutch; in a third, it is the gearset; a fourth errs in connection with lubrication; a fifth, on carburation; and a sixth, on ignition.

MANY are the conspicuous examples of empiricism during the past decade, and in many factories examples will continue for some years to come. When manufacturers first began building motor cars, the laboratory was an unknown quantity, and it was a crude guess as to the required size, strength, or design of many parts. In the early days, the presence of empiricism was first recognized by the maker in conjunction with the motor, and it is only within the last few years that a percentage of the designers have been constructing with due regard to what science has revealed as to the laws of gases, and liquids, which fact vitally concerns carburation. With many the fitting of a carbureter has been similar to a man purchasing a hat—trying to find one that fits properly, looks well, and will apparently endure for a time. In pleasing contrast with such empirics are those manufacturers who have gone into the science and theory of carburation, having due regard for all of the laws of gases, for all the laws of liquids for fuels, and, at the same time giving heed to the variable conditions under which these laws must act. With them it has been a study for years; an altering of design based solely on the facts as dictated by scientific research, and not on the opinions of this or that driver who, perchance, may have driven a car fitted with such device for 1,000 miles or more under varying climatic conditions, and who, under such vicissitudes, has expected uniform results, and because such have not been obtained has condemned the device.

BUT the empiricism of motoring is not all with the manufacturing end. It has been, and still is, a dominant factor with many concerns in the selling of cars. With manufacturers the command to the sales manager have been "sell cars," and the sales manager has immediately started to obey, and his success has been judged largely by the length of time and amount of money required to dispose of the product. With salesmanship the empiric has largely dominated because of the lack of organization throughout the industry, in comparison with other industries, in which the selling force of each manufactory is represented in some organization of salesmen which meets regularly in conventions and in which the science, theory, and practice of salesmanship are brought side by side, and conclusions arrived at after analyses and comparisons have been made.

EMPIRICISM in motor car salesmanship has been very expensive, in spite of the fact that the demand for cars has been so great that not a few manufacturers have actually had the cars sold and deposits in the bank before the material, out of which many parts of the car had to be fashioned, had reached the steel mill. Empiricism is always expensive in the long run, because it is generally desultory, often misdirected, generally haphazard, and invariably inconsistent. Today, with empiricism it is one policy, next week it is another, the week following may record a right-about turn, and there is always a lacking of a fixed, definite policy toward a certain goal, and the elimination of all factors that are not subservient to that opinion.

SUCH publicity methods sold cars; but they were expensive, in that a promoter only obtained, or cared for, one feature in connection with their run, namely, time. The object was to get from one point to another the quickest, irrespective of speed laws, fuel consumption, or wear and tear on cars, these being considered factors that were not deserving of recognition. The days of big sales, because of such performances, are practically over. Had the sales manager desired, while the speed element was not lost sight of, information could have been collected on fuel consumption under such conditions, and a story might have been obtained that would have been an element in his publicity campaign. To go further: If the designing force of such a car had been awake to the situation, scientific investigations could have been made throughout the run and notes taken which would have served most valuable for research work, and in the bettering of the car.

BUT the empiricism has not all been with the privately-promoted contest or performances; rather contests promoted by clubs and associations have savored largely of the empirical, in that only one feature was aimed at: In hill-climbs, in 98 per cent of the cases, it has been to the fastest car, no attempt being made that the most efficient car, except by one or two clubs, where formulæ have been introduced. In 80 per cent of the reliability runs, maintaining a schedule has been the only criterion and no attention has been given to fuel economy, carburation as it might be studied from exhaust analysis, and lubrication as it could be gauged by weighing the carbon collected in the cylinders during a long contest.

NEW JERSEY GOVERNOR TALKS MOTOR LAW

Franklin Fort Tells A. C. A. Members What His State is Doing—Test of Knight Motor

NEW YORK, March 26—The tenth annual banquet of the Automobile Club of America was held last night and contrary to the usual custom there was only one speaker—Governor Franklin Fort, of New Jersey, who delighted his hearers with his remarks concerning past, present and future legislation in his state. Also he told of plans for a magnificent boulevard from the Highlands to Cape May, a distance of 127 miles.

"The motor car industry has become a great one in this country," said the governor. "The motor car has come to stay, and legislatures and all others may as well recognize that fact. I took occasion today to examine some of the decisions in Massachusetts, and in the last report I found that they have the same doctrine we have—that the regulation of the motor car upon the highway is entirely within the control of the municipality under laws enacted by the legislature.

"This, then, leaves the question to legislation largely, if not entirely. We must approach the question of legislation on the motor car subject with the enlightened intelligence of Americanism.

"There is no question that the police power of the state is one of the things which we are interested in more than ever before. The American legislator needs to quicken his ideas and to approach these subjects along the lines of modern civilization and progress. Our laws must be clear and simple, so that every man can understand them and read them and make no excuse of not understanding them when he violates them. Second, we must have a speed limit such that the act will not create a race of lawbreakers.

"In the last message to the legislature I recommended that the speed limit be increased in the country districts to 30 miles an hour. The legislature up to the present moment has not acceded to that recommendation, but my belief is this: Stand for what you believe to be right and the time will come when those who are wrong will come where you stand.

"Every vehicle upon the public highway should carry a light of some kind at night. Every drunken driver should be deprived of his license and punished in some way for being drunk. No summary arrest should be permitted upon the highway of a man driving a motor car. He should be stopped only for the purpose of taking his number. Let the orderly proceeding in court go on after he has gone. No traps should be allowed to be set anywhere for the purpose of catching people on the highway.

"Our fees over in Jersey have been criticized. A man told me tonight he wished to see a sick friend in my state last Sunday but was unable to go without paying $10. My aide, Colonel Austen Colgate, is in our legislature and he has introduced a bill to relieve you of the hardship of paying such high fees for just a short visit. "Senator Knox once told me he did not want to cross New Jersey twenty-two times as he had from Valley Forge to New York without paying something for the privilege of using the good roads in the state. I believe that is the spirit of every man who owns a motor car. I have found that the man who owns a motor car is a public-spirited man, he is willing to do his share in maintaining and keeping the roads.

"Now we will solve the problem so that you will all be satisfied, in my judgment, within the next 20 days. We are trying to construct along our coast a magnificent boulevard from the Highlands to Cape May, a distance of 127 miles, and that road, with the exception of 7 miles, is in fair condition from the Highlands to Atlantic City.

"Interstate agreements are provided for under the constitution of the United States. With the consent of congress any two states may make any agreement they please between themselves, and if New York, New Jersey, Connecticut, Rhode Island, Massachusetts and Maryland shall agree together on a method of travel by motor cars and a uniform fee for all these states and it shall be approved we shall need no further legislation on the subject.

"This statement is made after a conference with the governor of your own state. I have an earnest hope that either at Trenton or Albany very soon there may be gathered together a conference of states by representatives to fix a uniform fee."

Severe Test of Knight Motor

Coventry, Eng., March 29—Special cablegram—A Daimler car fitted with the Knight valveless engines has completed with a perfect score the severe test conducted by the technical committee of the Royal Automobile Club. This test consisted first of running the engine continuously day and night for 132 hours, pulling its rated horsepower load. After this the motor was placed in a chassis and run for 2,000 miles on Brooklands track at a speed of not less than 30 miles per hour. This done, the car motor was transported to the block for an additional 5-hour run, all of which was carried out perfectly.

In the test two motors were used. The larger one, with 4⅞-inch bore and 5.1-inch stroke, ran at 1,200 revolutions per minute throughout the entire 132 hours, pulling 58 horsepower all of the time. This motor showed more power at the end of the 132 hours than it did at the start, and in the 2,000-mile test run on Brooklands averaged 40 miles per hour, whereas the rules of the test called for but 30. The small motor, with 3⅞-inch bore and 5.1-inch stroke, ran throughout the 132-hour block test at 1,400 revolutions per minute, pulling 39 horsepower continuously in the test and at a crankshaft speed of 1,600 revolutions per minute showed 45 horsepower. In the Brooklands test it maintained the 40-mile-per-hour schedule the same as the larger size and took the additional 5-hour test on the block.

One of the specific conditions of the test was that not a replacement of any nature was to be made from start to finish and throughout the test the motors were entirely in charge of the technical committee of the club, not one of the Daimler representatives being permitted to even suggest. As the record shows replacements of any nature were not necessary and the motors completed the tests with the highest honors. It was mutually agreed before the test that the complete details were to be published at the end of the ordeal whether favorable or not. On the Daimler side was one stipulation that the test should not be in excess of 132 hours or 2,000 miles on the track and that the speed must not be over 40 miles per hour even if the cars were capable of maintaining a much higher average. On the other hand, if the block test of the motor had ended after a couple of hours the details would have to have been made known by the club officials.

German Voiturette Trials

Berlin, March 18—The small car or voiturette trials promoted by the Kaiserlischer Automobile Club, of Germany, will take place August 29 to September 3. Only makers will be allowed to enter. No one can nominate fewer than three cars nor more than that number, the fee being $100 a car. For each car that fails to start or for every one that drops out during the trials the manufacturer will be debited 24 points. The trials are open to motor cars having four wheels, a four-cycle engine, and must not be of more than 6 horsepower. The minimum weight for a chassis with body must be 700 kilos or 1,540 pounds. For each tenth of horsepower less than 6 the weight may be diminished 25 kilos. A car having an engine rating up to 3.99 horsepower may have a body to seat two or four persons. A car of more than 3.99 horsepower must be provided with a body to seat at least four persons, as four passengers must be carried, in addition to the driver. If the number of people required are not carried then dead weight averaging 70 kilos per person will be put in the car. The contestants will start from Berlin August 30 and run to Braunschweig. On the next day the journey will be from Braunschweig to Weimar. September 1, the tourists will go from Weimar to Wurzburg, and on the fourth day from Wurzburg to Strasburg, where the prizes will be given September 3.

PITTSBURG SHOW BRINGS OUT BIG CROWDS

PITTSBURG, PA., March 27—With fully 10,000 people pouring into Duquesne garden, with the largest list of exhibitors, with unrivaled decorations and with as fine music as has ever thrilled the elite hosts which on important occasions are accustomed to gather in Pittsburg's great pleasure pavilion, the third annual local show opened tonight. Success and satisfaction are everywhere apparent. The members of the show committee, which has been working for months, has the right to feel that its efforts have been well rewarded. The first-nighters were with them from the moment they entered the big hall. Considering that a big proportion of these visitors had not only seen the two previous shows in Pittsburg but also attended many of the big shows of national reputation, it was most gratifying to hear the hearty expressions of praise.

Duquesne garden never looked prettier. The entire work of planning the decoration was in the hands of the Joseph Horne Co., of Pittsburg. White and green figure prominently in the color scheme, which is enlivened by the glint of gold in many places and is set off by the myriad of electric figures. The hall is hung with sweeping folds of silkoline and garlanded with electric bulbs. The balconies are draped heavily in white and green and overlook the court of honor. This court occupied the main floor, where marbleized shafts, caryatides, set designs of speed wheels, figures in bas relief, shields and various emblematic pieces are tastefully arranged.

Exhibits Are Unbroken

This year the booths are so arranged that the exhibits are unbroken. The promenade space also is better arranged to afford a good view of the big cars than ever before while from the upper balconies the view of the hall and the chance to inspect at close range the hundreds of accessories is excellent. The walls are practically covered with great mural paintings, in which the motor car predominates in the scenic effects.

In spite of the fact that Pittsburg has had two very successful shows, the 1909 exhibition is a great educator, even to the wise ones. At least $500,000 is invested in the displays which will be seen here all next week. About forty dealers are represented at the show, with nearly twice that number of cars on the floor. Although the show is not sanctioned by the Motor Accessory Manufacturers, more than fifty accessory dealers are here to show their goods. Three years ago the idea of a show in this city was roundly ridiculed. The first one was promoted under the greatest difficulties, as patronage and influence were both conspicuously absent at the start. It was a moderate success and served to bring home to the manufacturing and selling public that the city with hills and noise and dirt was destined to make as rapid advances in the use of motor cars as any of its more aristocratic neighbors. This has been borne out fully by the sales of 1907 and 1908. In no city in this country was the gain in the number of cars sold more rapid or the general spread of motoring sentiment more marked. With natural difficulties to contend with that threatened to be serious at first, Pittsburg has learned what machines are best adapted to her steep grades, narrow streets and sharp curves and has spent her cash freely to buy the best the market afforded. Quite as interesting has been the increase in capital invested in this city in garages and agencies, for during the past 2 years the number and importance of these has increased fully threefold. And it may be said further that the hard times which have been a most serious drawback to every line of business for the past 18 months have affected the motor car business here less than the majority of commercial interests.

A study of these facts, as reflected in the show opening tonight, is to good purpose. Hard cash, abundant enterprise, liberal patronage and all-around enthusiasm are seen to mark the display which is especially typical of one of Pittsburg's most remarkable lines of business. There is no city in America where the motor car is so much a factor in social and commercial life. There is no association of dealers that has gone about its work more systematically and intelligently than Pittsburg's, and there is no show committee the land over which has taken up its manifold duties with more eagerness and resourcefulness than have Chairman William Nimick Murray, Robert P. McCurdy, George P. Moore and C. F. McLaughlin, representing the Automobile Dealers' Association of Pittsburg.

Show Not a Local One

In no sense is the show purely local in its nature. The list of exhibitors shows manufacturers and dealers from all sections of the country. Every space was taken several days before the show opened and all today the officials have been besieged by late arrivals for space for more cars. To accommodate some of these the general space arrangements were altered at the last moment somewhat and several new displays will be seen Monday. The benefits which were derived by exhibitors of 1907 and 1908 have proven conclusively to the man who is hunting trade that Pittsburg is a good place to show his wares. It it not as a maker of agencies that the Pittsburg show takes first rank. Although dozens of dealers from the thriving towns of western Pennsylvania, eastern Ohio and West Virginia will be here next week, they will not book many new agencies. President Murray announced tonight that the standard makes of cars are not being distributed in this way as much as heretofore and that the chief gain which will be expected from the show is in the general interest and impetus to buying which will be aroused among the hundreds of out of town visitors. Some of these are bound to make their purchases in Pittsburg during show week, as last year's records proved. A large proportion of the remainder will buy at no distant date, after having secured a more intelligent idea of the great line of cars offered.

Non-Motor Stop Maxwell Arrives

Mayor Reyburn, of Philadelphia, sent his greetings to Mayor George W. Guthrie, of Pittsburg, by the 2,000-mile non-stop Maxwell, Junior, which brought up at Duquesne garden yesterday morning and which is now on display at the show.

Pittsburg will soon be well known as the home of two cars of her own. One, the Pittsburg Six, is already well introduced to the buying public. It is manufactured by the Fort Pitt Motor Mfg. Co. The other car, the Belden, is the invention of Pittsburgers.

Most encouraging reports are received

AT PITTSBURG—THE SHOW ON THE OPENING NIGHT

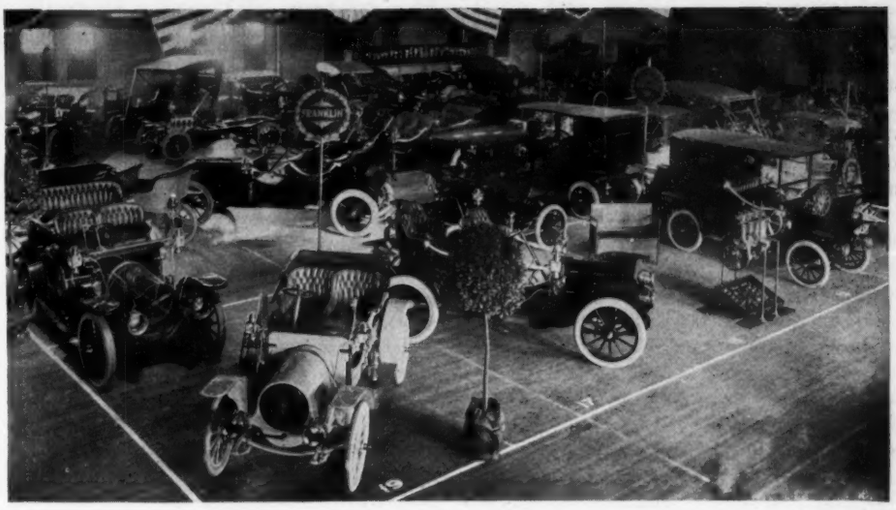
from all the big agencies in Greater Pittsburg concerning the relative demand for cars as compared with that of the two previous years. At both the former shows good sales were made especially to out of town customers. The opening night served to show that buyers were not wanting and that dozens had waited only for the opportunity to view the big collection of cars of national reputation to make their purchases. A special musical program has been arranged for every afternoon and evening of next week. Thursday evening will be "society night."

List of Exhibitors.

Arlington Motor Car Co.—Pittsburg, Jackson.
Anderson Automobile Co.—Wilkinsburg, Atlas.
Banker Brothers Co.—Stevens-Duryea, Chalmers-Detroit, Pierce-Arrow.
Bellefield Motor Car Co.—DeLuxe, Woods electric, Couple-Gear, Oakland.
Belden Motor Car Co.—Belden.
Buick Motor Car Co.—Buick.
Benson, B. F.—Studebaker.
D. P. Collins—Lozier.
Eastern Automobile Co.—Atlas.
East End Automobile Co.—Waverley electric, Pope-Hartford.
Fort Pitt Automobile Co.—Locomobile.
Fort Pitt Motor Mfg. Co.—Pittsburg Six.
Hamilton Automobile Co.—Kisselkar, Middleby.
Hiland Automobile Co.—Peerless, E-M-F.
Imperial Motor Car Co.—Cadillac.
Speedwell Automobile Co. — Speedwell, Schacht.
Keystone Automobile Co.—Welch, Stoddard-Dayton, Velie, Columbus electric.
Maxwell-Briscoe Co.—Maxwell.
Mutual Motor Car Co.—Stearns, R. & L. electrics.
Overland Motor Co.—Overland.
Olds Motor Works, Pittsburg branch—Oldsmobile.
Premier Sales Co., Lts.—Premier, Reo.
Pittsburg Automobile Co.—Thomas.
Regal Agency, Wagner & Feicht—Regal.
Standard Automobile Co.—Packard, Franklin.
Winton Motor Car Co.—Winton.
Wilkinsburg Automobile Garage—Elmore, Baker electric.
White Co.—White steamer.
Milhuish & Hemphill—Palmer-Singer and Simplex.
F. W. Fisher—Mora, Jewell, Marmon.
Co-operative Automobile Co.—Moline.
Acme Motor Car Co.—Acme.
Pittsburg-Mitchell—Mitchell.
Matheson Agency—Matheson.
E. J. Thompson Co.—Motor car bodies.
Knox Motor Co.—Knox.
Urling & Co.—Corbin.
Accessories—Air Tight Steel Tank Co., Atlantic Refining Co., Atlas Rubber Co., Auto Specialty Co., Banker Wind Shield Co., Doubleday-Hill Electric Co., Charles H. Dressing, Eyler & Henry, W. L. Clark Co., Ennis Rubber Co., East End Cycle Co., Eagle Lubricating Co., E. Flentzes, James L. Gibney & Brother, Independent Tire Repair Works, Frank U. Morton, McGraw-Burgess Vertical Fabric Co., A. E. Kent, Pittsburg Auto Equipment Co., Pittsburg Rubber Co., Perfection Wrench Co., Royal Equipment Co., Reinforced Brazing and Machine Co., John A. Salman, Saunders & Bremer, Standard Automobile Co., Westinghouse Co., Joseph Woodwell Co., H. W. Johns-Manville Co.

RECORD FOR LOCOMOBILE

Los Angeles, Cal., March 29—Special telegram—R. J. Leavitt's 40-horsepower Locomobile yesterday defeated H. L. Gordon's 60-horsepower Stearns in a 150-mile match race at Ascot park track, in which the Locomobile covered the distance in 2:47:01⅗, an average of 53.87 miles per hour, which is claimed as a world's track record. Bert Latham drove the Stearns and Murray Page the Locomobile, and at the finish the latter was 2½ miles to the good. The race was held under the auspices of the Elks, who also were given the gate receipts, the two cars racing for a trophy, although at first it had been proposed to run for $5,000 a side.



AT SYRACUSE—LOOKING DOWN FROM THE BALCONY

Syracuse Show Proves a Business-Getter

SYRACUSE, N. Y., March 27—The doors of the New York state armory closed on the first annual motor car show for Syracuse after a run of 4 days, during which time over 10,000 people paid admission. Each one of these visitors, according to conservative estimate, represented $20 to the dealers, which is to say, that $200,000 worth of cars were contracted for during the show. In round numbers there were 100 cars disposed of, at an average price of $2,000 each, while the sales in the accessories department amounted to many dollars additional.

The main floor of the armory was completely occupied with cars, and it was necessary for the Knox and the Gaeth to secure outside quarters in a nearby building, where displays of cars of both these makes were made. The basement was devoted to the accessories and supplies, but this proved inadequate to accommodate those who desired to exhibit, so an annex was established in the new Griffin building, about half a block distant.

Every train brought scores of visitors to the show, and they were not all sightseers alone. Many of the best sales which were made during the week were to visitors from the surrounding towns and cities, and from this time on there will be a general trek of new cars from about twenty-six factories to all points in central New York. One of the outstanding features of the Syracuse show was the fact that the purchasers, both actual and prospective, were apparently seeking the high-grade cars. This will be seen from the fact that the average price of the cars contracted for was in the neighborhood of $2,000. A number of the dealers in high-grade cars were obliged to refuse many orders for this year's delivery from the fact that they had been completely sold out, and were forced to turn their attention to the cheaper grades.

Some 1910 Cars Sold

A large number of 1910 orders were taken and in some instances big premiums offered for early deliveries. There seemed to be a grim determination on the part of the buyers to get a car at any

AT SYRACUSE—GENERAL VIEW OF THE MAIN FLOOR

price once they had decided upon which make they wanted.

To the merchant and the business man who require the services of delivery wagons, the exhibition of motor trucks by the Chase Motor Truck Co. and by Leon Conde with Brush delivery wagons, proved a strong attraction.

By far the most attractive and comprehensive exhibit at the show was that of the H. H. Franklin Mfg. Co., whose headquarters are here. The Franklin company had eleven cars. There also was an attractive exhibit of Thomas cars, two by the Syracuse Autocab Co. With the accessories in the basement, there was a display of motor cycles that created considerable favorable comment.

The show, which was arranged by the Syracuse Automobile Dealers' Association for the purpose of providing something novel for the people of central New York in the way of a midwinter exhibition, turned out to be a great business getting institution for the dealers. At 2 o'clock on Wednesday the show opened and from that time until the last strains of "Home Sweet Home" died away tonight there was a continuous stream of visitors into the building.

List of Exhibitors

Amos-Pierce Automobile Co.—Chalmers-Detroit, Stevens-Duryea and Lozier.
Oldsmobile Automobile Co.—Oldsmobile.
Buick Motor Car Co.—Buick.
Syracuse Autocab Co.—Thomas and Selden.
H. H. Franklin Mfg. Co.—Franklin.
Leon Conde, Inc.—Brush.
C. Arthur Benjamin—Packard, E-M-F and Elmore.
Maxwell-Briscoe-Syracuse Co.—Maxwell.
Mora Sales Co.—Mora and Regal.
Genesee Motor Car Co.—Peerless, Cadillac and Pope-Hartford.
F. L. Wightman—Winton S.
Syracuse Motor Car Co.—Ford, Pullman and Overland.
W. E. Hookway—White steamer.
Chase Motor Truck Co.—Chase motor trucks.
Charles E. Wethey—Reo.
Accessories and supplies—Atlas Sales Co., Syracuse Supply Co., E. B. Van Wagner Mfg. Co., C. Arthur Benjamin, Buick Motor Co., J. A. Seitz, W. F. Polson, Buffalo; Central City Rubber Co., C. E. Mills Oil Co., F. L. Reed, Amos-Pierce Co., O. M. Edwards Co., Clinton Vulcanizing Co., Syracuse and Elbridge Glove Co., Wonder Mfg. Co.

Hoosier Show Week Proves Great Success

INDIANAPOLIS, IND., March 29—Although the weather required several changes in program, the third annual motor car show and opening which closed Saturday night was distinctly a success. The week ended with a banquet at the Denison hotel when about 150 tradesmen and their friends celebrated the success of the week. Mayor Charles A. Bookwalter was the principal speaker.

A conservative estimate would place the number of cars sold during the week at from 350 to 400, while each dealer has numerous good prospects in line. Cars listing at $2,000 and under had the greatest sale, although a number of orders were placed for higher-priced touring cars. Even the motor buggy dealers and agents had a good business, one agent reporting sixteen orders during the week.

Come From Everywhere

The show brought hundreds of people to the city from all parts of Indiana and farmers were very much in evidence. Dealers say that the farmers showed no little enthusiasm and that many of them placed orders, although such orders were largely for low-priced runabouts. The show also gave agents through the state an opportunity to bring prospective customers to the city, where they could seee a full line of models of the makes represented by the agent. In several instances dealers in small towns spent the week in the city.

In the parade, which was postponed from Wednesday until Friday because of rain, the rapid growth of the motor car industry in the city was clearly depicted. Where parades in former years have had from 150 to 200 cars in line, there were 365 cars in the one Friday. An interesting feature was the unusually large number of commercial cars.

While the parade was of great interest, there was considerable regret that the show committee ruled that cars should not be decorated. Believing the parade would be held Thursday afternoon, before the ruling concerning decorations was made, the Overland Automobile Co. decorated one of its cars at no little expense. A canopy of smilax and red roses formed a top, while the name "Overland" was shown on the hood in yellow flowers. By the time the parade was held Friday, the flowers had wilted. There was one exception to the rule concerning decorations, the Rapid delivery wagon owned by Bertermann Brothers, florists. This car was decorated in an extravagant manner with cut flowers and smilax and the parade committee did not attempt to rule it out of the parade.

The parade formed at North Meridian street and the Fall Creek boulevard, the sections forming on the side streets and falling in place in regular order. The various dealers and manufacturers had been given positions by lot. Leading the parade were four bicycle policemen, followed by the Rapid police patrol wagon and the new National police emergency touring car. Then came the Warner Autometer and the new Waverley electric ambulance built for the city dispensary. Back of the ambulance was the Indianapolis military band of twenty men riding on a gasoline truck. There was also a band in the commercial car section, the players being dressed in grotesque costumes.

Forty-seven Overlands in Line

Each dealer had out every model he represents. Cards of uniform size appeared on either side of each car, stating the make, model, price and the name and address of the dealer. No other advertising matter was permitted. Those having the largest number of cars in line were the Overland Automobile Co. with forty-seven, ranging from a runabout to the mail wagons and taxicabs, and the Indianapolis Motor Car Co. with fifty Rapid trucks and delivery wagons. One of the neatest displays was the line of Waverley electrics, practically all of the drivers being women. One of the Overland drivers was a 10-year-old girl. The Premier, Marmon, American and Marion cars, all entered by local manufacturers, attracted no little attention.

The commercial car section was of considerable interest. There were three large sight-seeing cars, all filled to their full capacity with passengers. Other cars that attracted interest were: Delivery wagon of Sander and Recker, filled with furniture, with large rugs fluttering from each corner of the car; delivery wagon of Taylor Carpet Co., filled with furniture and carpets; Coppock truck of Starr Piano Co. carrying two pianos; truck of Shank Furniture and Storage Co., with two large office desks, at one of which sat Uncle Sam. Milk dealers, plumbers, wholesale

At Indianapolis—The Band in a Motor Truck

grocers and dry goods dealers and numerous retail concerns were represented in the parade.

Following the parade there was an obstacle race on the North Capitol avenue boulevard from Vermont to Michigan streets and return. Barrels were scattered along the street, the object being to see which car could make the fastest time and disturb the fewest barrels. The winner was George L. Bixby, driving a Waverley electric who covered the course in 1:06 without disturbing a barrel. Bert Haught in an Overland covered the distance in 1:05, knocking over eight barrels. B. C. Beard made the trip in 1:57 in an Overland and disturbed six barrels.

Smashes the Barrels

At the conclusion of the contest, permission was granted P. M. Becon to try the course with a view to making the fastest time and smash all of the barrels possible. His time was 37 seconds and there was little left of the barrels but a few staves and hoops.

On Wednesday night thirty Indiana agents of the E-M-F were entertained at dinner at one of the local hotels.

During the week the Fisher Automobile Co. made three demonstrations daily on the incline running from Vermont street to the top of its three-story building.

PITTSBURG DATES CHANGED

Pittsburg, Pa., March 29—Great interest has been aroused all over western Pennsylvania by the Gazette-Times-Chronicle-Telegraph endurance and reliability run to be held April 28, 29 and 30. Inquiries are pouring in rapidly. F. L. Ferguson has been selected for referee. Social events such as theater parties, etc., are being arranged and an orchestra has been secured. Each entrant has an equal chance for the beautiful silver cup donated by the two newspapers. The contest was originally appointed for March 17, 18 and 19, but was changed to a later date on account of the bad weather. E. W. Cole will be pilot.

Many French Makers Are Against Shows

PARIS, March 15—Forty of the leading motor car manufacturers of France and many makers of parts and accessories formally decided at a meeting of the Chambre Syndicale de l'Automobile et des Industries qui sy rattachent, which was held Saturday, that they would not take part in any motor car show in France in 1909. Those signing not to show include: Aries, Gladiator, Berliet, Gregoire, Brasier, Corre, Vinot & Deguignand, Bozier, Delaunay-Belleville, Delaugere & Clayette, Peugeot Freres, Peugeot Co., Westinghouse, Pilain, Panhard & Levassor, Renault, de la Buire, Delahaye, Darracq, Fouillaron, de Dietrich, Rolland-Pilain, Prunel, Georges Richard, Motobloc, Doriot-Flandrin. The Paris agents of the Martini and Mercedes concerns also voted against the salon, while letters received from Benz, Gobron-Brillie and Rossel were as good as a vote against the show idea. Among other firms and houses which decided the same way but which are not car makers are the body-making concerns of Kellner, Labourdette, Belavalette, Audineau & Co., the Michelin company, Bleriot, the lamp maker, and others. All told, sixty-two concerns decided against taking part in any show in the current year.

It may be of interest to mention some of the car makers which either are in favor of a show or who are undecided. Among them are to be found the Cottin & Desgouttes, Decauville, Weyler & Richemond, Hotchkiss, Mors, S. F. A., Brouhot, Leon Bollee, Alcyon, Bayard-Clement, de Cohendet, Regina, Sizaire & Naudin, Werner, Bazelaire, Charron, Sinpar, Turicum, Dion-Bouton, Delage, Legros, Labor, Hurtu, G. E. M., Tourand, Luc Court, Vedrine, Electromotion, Porthos, and a large num-

In a letter addressed to the editor of a Paris daily sporting paper, de Dion-Bouton & Co., regarding the show question, say, among other things: "Allow us to state that there are French concerns—and among them this house—which consider and always have considered it as absolutely necessary to hold a motor car show. The very reason these concerns have thought so is because of the foreign attacks, knocks or opinions against the French industry, such as published in a Belgian journal recently. Whatever others might do is their own business; we have not to judge them. As to ourselves, we are decided to exhibit our cars, and whatever might be said regarding the vote upon the show question by the Automobile Club of France, we think it is not admissible that there be no show."

Belgian Criticisms

The article in the Belgian paper which brought about this statement from de Dion-Bouton was a bitter grilling of the French industry. The Belgian writer, who always has been closely connected with the powers that be within the Automobile Club of France, and some of the Paris trade associations, came right out and said that there exists no other reason for the desire of France to have no more races and no more salons than the fact that it is losing its former grip on the sport and industry. In conclusion, the Belgian dared to say that Belgian cars are now the equal in most all cases and the superior in many others of any French car. Editor Desgranges of l'Auto has seen fit to take issue with the statement, and declares the Belgian is not only mistaken, but makes misstatements when claiming Belgian cars are better or even the equal of those made in France. At any rate, the controversy between the two newspaper scribes has turned attention to the salon question, and the de-Dion-Bouton people are now the talk of the French motor world. Everybody seems to be asking: "Where will the salon be held and who will be there?" It seems certain at any rate that de Dion and those other concerns that are in favor of the Paris salon will not be able to get the grand palace, should they want it, as it is said the French club has a deal with the government whereby only the A. C. de F. will be permitted to promote a motor car show in that big building.

AT INDIANAPOLIS—LINED UP FOR THE PARADE

PETREL PLANT TO MOVE

Milwaukee, Wis., March 29—An announcement was made in Milwaukee early this week, when negotiations were closed by the Petrel Motor Car Co., of Kenosha, Wis., for a long-term lease of the Pfister & Vogel Leather Co.'s Virginia street foundry in Milwaukee, and that on May 1 the Kenosha works will be moved to Milwaukee. The foundry is situated at 480-484 Virginia street, Milwaukee. It is 80 by 170 feet in dimensions, of solid brick and steel construction and one story high.

MAKERS BALK ATRACES

Manufacturers' Association Refuses to Endorse Two Transcontinental Events

New York, March 31—Special telegram—Manufacturers and importers of motor cars in a regular meeting of the Manufacturers' Contest Association held in this city Tuesday after considerable discussion and hearing representatives of the Alaska-Yukon-Pacific exposition, the Automobile Club of America and the New York Times decided not to give the support of the recently formed organization in the promotion and running of two proposed trans-continental contests.

The M. C. A. delegates stated, however, that they were not opposed to such contests but inasmuch as the rules for the run to Seattle did not meet with its approval it did not feel that it should sanction another event as a rival to the one sanctioned by the Automobile Club of America. This meant the proposed contest of the New York Times, the management of which clearly stated that it did not intend to promote any such event except that it met with the approval of a substantial portion of the industry. The decision of the manufacturers was embodied in the following resolution:

Whereas, The Manufacturers' Contest Association advocates and will lend support to races and contests that furnish to the public a basis of the comparative merits of cars and that demonstrate to the manufacturers where improvements can be made in material and construction to the end that only the best in motor cars may be offered to the buying public, therefore, be it resolved that the Manufacturers' Contest Association in meeting decides unanimously that for the following reasons it cannot lend support to the proposed race from New York to Seattle, although sanctioned by the Automobile Club of America, whose right to grant a sanction for this event is unquestioned.

First, the entry blanks distributed among the manufacturers state that it is a race and as such it cannot but place a premium on speeding in violation of state laws, which is contrary to the position motor car makers have taken with the various state legislatures.

Second, the rules on the entry blanks, which among other things provide that engines, axles, gears, etc., may be changed twice and only the original frame brought to Seattle, are not for the betterment of motor car manufacture.

Third, the entry blank statement the first car arriving at Seattle will be declared the winner presupposes a road race without regard to speed regulations, the prize going to the car whose drivers most consistently and persistently disregarded the conditions and laws under which the authorities permit the use of motor cars.

Fourth, another rule provides that the crew of a car may drive continuously from New York to Seattle or as nearly so as the endurance of the crew relieving each other will permit. The contest would, therefore, be strung out over a period of hours and days, making it impossible to safeguard the highways and the public for the continuous time necessary.

Fifth, the rules as a whole or the explanation of the race representatives does not assure the Manufacturers' Contest Association that the contest will advance either the pastime or the industry.

Sixth, the excellent record of the Automobile Club of America in the sport and industry makes it a matter of regret that it should have given its sanction to the rules that are offered for the government of this proposed race.

At the conclusion of the conference the vote was taken among the following men who were present at the meeting: Edgar Apperson, A. P. Brush, H. E. Coffin, E. H. Tangeman, C. M. Hamilton, H. G. Farr, A. L. Riker, H. A. Lozier, C. A. Emise, Benjamin Briscoe, R. H. Croninger, G. A. Weidely, Paul Lacroix, F. B. Stearns, F. A. Barker, Walter C. White, E. P. Chalfant and Alfred Reeves.

The questions of speed and changing of parts of cars seem to be the reasons predominant influencing the M. C. A. against the contest. The rules do not place a time allowance which would make the contesting cars keep within the various speed laws, and engines, axles, gears, etc., can be changed twice in the trip across America, only the original frame having to be used throughout.

While Mills and Moore, and Robert Lee Morrell, of the Automobile Club of America, express regret that the manufacturers and importers have taken a stand against the event, they state that nothing shall deter them in the holding of the contest. The management claim positive assurances of enough cars to make the event a success.

MAXWELL TEST STILL ON

Boston, Mass., March 30—Special telegram—Shortly before noon today the Maxwell car in its 10,000-mile non-motor-stop run had covered half the distance. The engine had been running then very nearly 300 hours and despite the tremendous strain it was hitting perfectly. For a week it rolled back and forth to Worcester and last Thursday the route was shifted to Providence. This is about the same distance from the Hub as Worcester, but while there are not so many hills to climb the roads are worse, as they are considerably rutted. There was a severe storm last Thursday that swept Massachusetts and the car had to plug along through it just the same. On one of its night trips the wind was blowing a terrific gale and it succeeded in getting under the hood and lifting it off the motor. It was quickly secured in place again and the trip continued. The car is averaging aboue 20 miles an hour on the country roads. On Thursday there will be another change in the route and this time it will head for Newburyport. After traveling to that place, if the motor is still plugging along without a stop, then the finish will embrace alternate trips between Boston, Worcester, Providence and Newburyport.

Boston, Mass., March 31—Special telegram—Up to 5 o'clock this afternoon the Maxwell car that is striving for the 10,000 non-motor stop record had covered 5,343 miles without mishap.

PRIZES FOR ALL CARS

New System of Awards for Quaker City Motor Club's Second Annual Roadability Test

Philadelphia, Pa., March 29—To Secretary Harry Harbach, of the Quaker City Motor Club, must be given the credit of having invented a form of motor competition which is not all work and in which all contestants, amateur drivers as well as the paid, will have an equal chance at the prizes. Indeed, the rules have been so framed that every contesting driver who finishes will receive a bit of plunder, valued in proportion to his place at the finish. Sitting next the stove in the back room during the bleak wintry days, Harbach evolved the scheme, and from the way entries are pouring in it looks like a winner, for even the tyro realizes after he reads the rules that he has a chance against the paid chauffeur, and that he can take his wife and children along to share his triumph in case of a win.

Harbach's scheme will be given its initial trial on Saturday, April 24, on the occasion of the second annual roadability run of the Q. C. M. C., to Atlantic City. The contest committee had just selected Cape May as its objective point, but the fact that the big hotel there will not open till later necessitated a change of date. Mayor Reyburn has consented to name the official time for covering the course, which, to avoid the possibility of a tie, will be drawn so fine as to include seconds and possibly fractions of a second. Each driver will be handed a sealed envelope in which will be enclosed in cipher the exact time he is due at the finish. Thus the result will be known within a few minutes of the time the last car crosses the finish line.

But the really novel feature of the Quakers' run will be the system of prize distribution. It reads very like the old Louisiana lottery results, the difference, however, being that the contestants get everything back, the club doing all the work and spending all the receipts to furnish a holiday for the entrants. The winner will get the grand prize—a sterling silver trophy; the driver of the second car to finish will be awarded the place prize—also a sterling silver trophy, but of lesser value, while the driver of the third car to cross the line will be given the show prize—a silver trophy of still smaller worth. After that the plunder will be divided into series ranging from A to G inclusive, these approximation prizes being in the form of handsome souvenirs, each series lessening in value the farther removed the contestant's time is from the official figures. Thus, in series A there will be ten prizes, to cars finishing fourth to thirteenth; in series B there will be twelve prizes, to cars finishing fourteenth to twenty-fifth; in series C there will be

fifteen prizes, to cars finishing twenty-sixth to fortieth; in series D there will be twenty prizes, to cars finishing forty-first to sixtieth; in series E there will be twenty prizes, to cars finishing sixty-first to eightieth; in series F there will be twenty prizes, to cars finishing eighty-first to one hundredth; series G will include prizes to cars finishing one hundred and first up.

The contest committee of the Q. C. M. C. took action last week on the advisability of running off its annual spring race meet, and, much to the surprise of all hands, came out with an announcement that the fixture would not be abandoned; that it would take the form of a 24-hour race, and that it would take place on Friday and Saturday, June 11 and 12.

FAST TIME IN FRISCO

San Francisco, March 31—Special telegram—The first hill-climb of the season was held in this city Sunday afternoon. It was held on Nineteenth avenue boulevard, just south of Golden Gate park. The course was 1 mile in length and straight from start to finish, so that the 5,000 spectators could line along the hills and watch the cars at every point of the race. Timing was done by an electric apparatus worked by the cars themselves as they broke tapes at start and finish. The feature of the day was a match race between model O White steamer and a 25-horsepower Stoddard-Dayton. The White covered the mile in 1:12⅖, while the Stoddard driver had trouble in getting into high gear and did not run the full course. The Stoddard protested the White on the ground that all its parts were not stock. The judges, however, on investigation found that there was no written agreement covering the conditions of the match race and decided it was no contest. They allowed the White time as the fastest of the day. The class event for cars costing $1,200 or less was won by the Buick White Streak in 1:24⅘. A Thomas Forty won the event for cars costing more than $1,800 and less than $3,000, its time being 1:21⅘. The Stearns captured the $3,000 and over class, and the Stoddard-Dayton the class between $1,200 and $1,800. The free-for-all was taken by the Stanley steamer in 1:13⅗, the Comet running second in 1:15⅕, making the fastest time for gasoline cars during the day.

CLEVELAND IS APATHETIC

Cleveland, O., March 29—Cleveland is in a somewhat apathetic state regarding the 1909 Glidden tour. The Peerless people decline to make any statement regarding their chances of entering the tour, but the general impression is that the Peerless will not be represented. The same is true of the Stearns, while the Winton people do not take part in any events. The chances of the White steamer being found in line again are bright, and the expectation is that this car will be represented without fail. However, the White people never make their plans public.

LAY OUT SCENIC ROUTE

New York Dealers Announce Itinerary of Their 3-Day Catskill-Berkshire Trip

New York, March 29—The route for the proposed 3-day Catskill-Berkshire tour scheduled for June 12, 13 and 14 by the New York Automobile Trade Association covers a picturesque and rolling country and offers opportunities for testing the hill-climbing capabilities of the contesting machines. Leaving the Automobile Club of America on the morning of June 12 at 8:30 o'clock, the cars will be headed for Tarrytown, where a special ferry service will be engaged to convey them across the Hudson to Nyack, where the route will lead to Arden in the Highlands of the Ramapo. After leaving Arden, the overland caravan will be piloted to Tuxedo, for which privilege a committee is now arranging with those in authority. If the request is granted it will be the first time in the history of the most exclusive reserve in the world that a motoring caravan has invaded its precincts. From Tuxedo the cars will run to Kingston, where the night control will be located. On the following morning the start for Catskill will be effected at 9 o'clock, and after a delightful and exhilarating tour of the mountains, the cars will be turned in the direction of Albany for the noon stop. Leaving the Capital City at 3 o'clock, an easy run will be made to the Berkshire country, passing through Lebanon, Pittsfield, Lenox and pulling up sharp at the Berkshire Inn, Great Barrington, for the night. Bidding adieu to Great Barrington at 8:30 next morning, the cars by easy stages will pass through Lakeville, Millerton, Wassaic, Dover Plains and will reach the Lee house, at Paulding, in time for luncheon. Starting promptly from Paulding, the tourists will travel through an unusually attractive country, made up largely of the summer homes of prominent New Yorkers. After passing through Paterson, Sodom, North Salem, Cross River and White Plains, the contestants will check in at the Automobile Club of America, New York City, at 6 o'clock in the evening. The committee in charge of the run is composed as follows: C. P. Skinner, chairman; Harry Fosdick, Richard Newton and Peter Fogarty.

The tour is not the only event planned by the trade association, which is at the present time engaged in preparing for its spring carnival, particular attention being paid to the parade on the afternoon of May 1. It has been decided to award cash prizes in the pleasure car division, $500 going to the most handsomely decorated car; $250 for second prize and $150 as third. In the commercial section there will be $500 for the best decorated and most appropriate float or display; $200 for second and $100 for third. The most grotesquely decorated car will receive $200 and the second $100. Only cars entered by firms contributing to the carnival fund are eligible. The line of march for the afternoon parade has not been definitely decided upon, although it will take in the row complete. The probable route will be on the streets running east of Broadway from Eightieth to Eighty-fourth, the parade to move north on Broadway to One Hundred and Eighteenth, countermarching south on Broadway to Forty-eighth, then east to Fifth avenue, and north on Fifth avenue to One Hundred and Tenth street. This route cuts out many objectionable car crossings which marred to a great extent the last 3 miles of the parade a year ago. With a string of 3,000 cars extending 7 miles in length it is, of course, impossible to avoid crossing some street car lines. By cutting out that portion of the line of march from Forty-eighth street to Twenty-fifth street, more than one-half the crossings encountered last year are eliminated.

CLOSING UP TANK BUSINESS

Milwaukee Wis., March 29—The Avery Portable Lighting Co., of Milwaukee, Wis., is at present closing up its business in gas tanks used for supplying gas for lighting purposes, this action being imperative because of the injunction granted on February 3, 1909, by the circuit court of the United States in the eastern district of Wisconsin prohibiting the company from selling gas stored in tanks or recharging tanks. The court injunction was based on the infringement of the three claims in the Claude & Hess patent No. 564,383:

1—A closed vessel containing a supersaturated solution of acetylene produced by forcing acetylene into a solvent under pressure, said vessel having an outlet for the acetylene gas which escapes from the solvent when the pressure is released or reduced, and the means for controlling said outlet whereby the gas may escape therethrough at substantially uniform pressure, substantially as described.

2—A prepared package consisting of a tight shell or vessel; a solvent of acetylene contained within said vessel; and acetylene dissolved in and held by said solvent under pressure and constituting therewith a supersaturated solution, the package being provided at a point above the solvent with a reducing valve, substantially as and for the purpose set forth.

5—As a new article of manufacture, a gas-packing comprising a holder or tight vessel; a contained charge of acetone, a volume or body of gas dissolved by and compressed and contained within the solvent; and a reducing-valve applied to an opening extending to the interior of the holder above the level or the solvent, substantially as set forth.

The suit against the company was carried on by the Commercial Acetylene Co.

PATHFINDER IN CHICAGO

Chicago, March 31—The Thomas Flyer that is pathfinding the route for the New York-Seattle endurance run, reached Chicago at 10 o'clock last night, after having been a trifle over 9 days on the road. George Miller is driving. After resting today, the pathfinders start tomorrow morning on their long journey. The worst stretch of road encountered so far was between Buffalo and Fredonia, where it took the car 10 hours to go 44 miles because of the clay mud on the highways. They go from here to St. Louis.

England Transports an

MILITARY LEAVING PEUGE

TROOPS PREPARING FOR THE TRIP

Ten Hundred and Fifty Men, Ammunition and Stores Carried 60 Miles from London

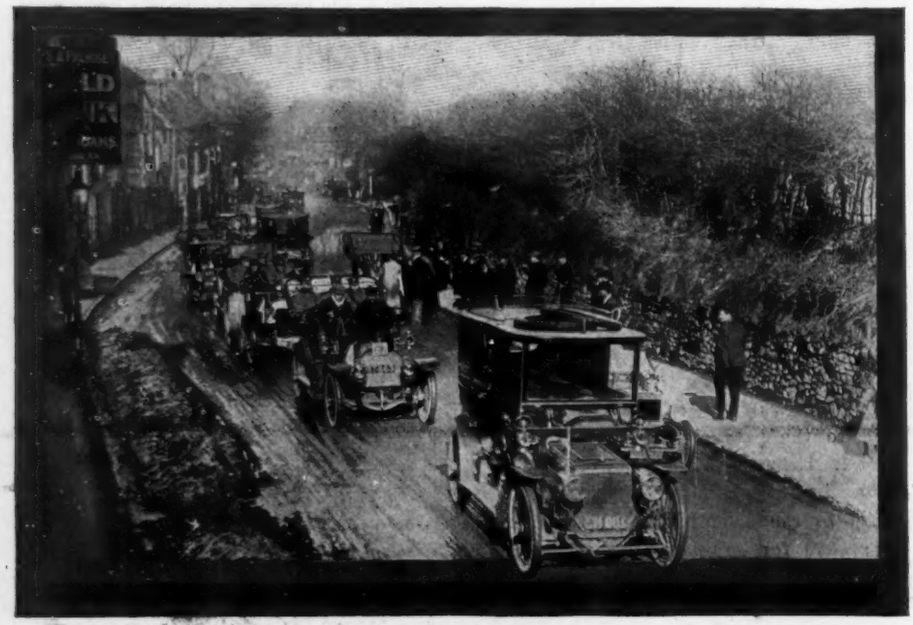
LONDON, March 18—As transportation has ever been a paramount feature of military maneuvers, it is most interesting to imagine the important part that would be played by modern motor vehicles in case hostilities were declared between some of the powers prominent in the use of motor cars. A great experiment in the transportation of troops was recently made by the war office, which in conjunction with the Automobile Association of that city, succeeded in carrying over 1,050 men, ammunition and stores to a point more than 60 miles from London within 5 hours.

The scheme of the operation was that a sudden concentration of troops had become necessary at Hastings, on the south coast, in order to deal with an attempted raid. The railway having been destroyed, recourse was made to motor cars to effect the mobilization of a brigade of guards at a point from which they could go boldly to Hastings by road. The first visible indication to the public that something special was being undertaken by the war office was given about 1:15 p. m. on Tuesday, when no fewer than twenty-nine motor vehicles dashed through the gateway of Chelsea barracks. The fleet of vehicles, which comprised twenty-one light trucks, five bus chassis with their usual bodies replaced by platforms, and three large 3-ton vehicles, had come down in procession from the works of a firm at Acton.

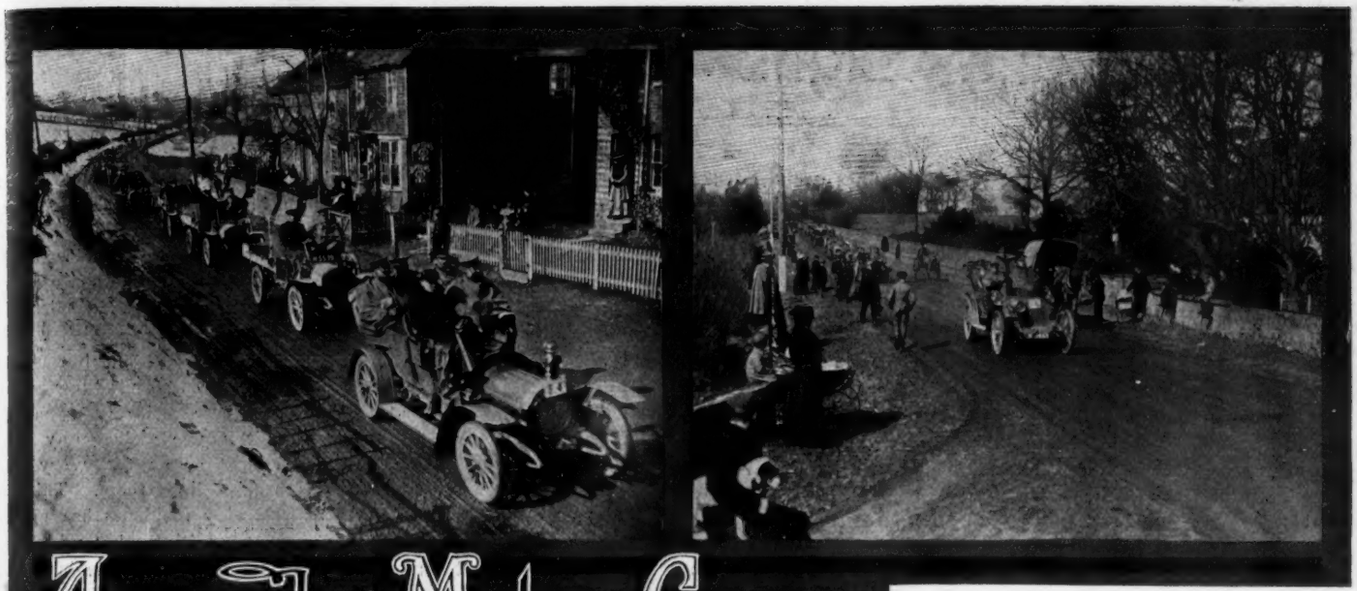
Only a minute or so elapsed ere a signal was given, and each vehicle moved off to the particular part of the drill ground that had been allotted to it, and after a further signal squads of men immediately commenced to load up the machines with the various stores that had to be conveyed to Hastings and back on Wednesday. On the lighter vehicles ammunition, trenching tools, signaling stores, water carts, and much other military impedimenta were quickly loaded, while the larger vehicles each received its quota of goods appertaining to the commissariat department—traveling kitchens and supplies, bedding, etc. So quickly and orderly was the work carried out that within ¼ hour the whole of the fleet of vehicles was loaded, and shortly before 2 p. m. all that remained to be done was to place the cars under shelter ready for the morrow.

In all 286 cars and twenty-eight chassis were actually employed in the transport, and these were divided into seven sections, each of which was designated by one of the first seven letters of the alphabet, and all the cars composing each section carried a distinctive colored flag. The first section consisted of twelve cars, carrying the scouts and the commanding officer and his staff. Sections B to E each consisted of sixty-six cars, in which were carried two companies of guards, while sections F and G constituted the two lines of transport carrying guns, ammunition, water, medical corps, transport officers, etc.

Shortly before 9 o'clock on Wednesday morning the cars began to put in their appearance at the southeast corner of the Crystal Palace grounds, which had been chosen as the general rendezvous, and hither all sections wended their way with



PASSING THROUGH SEVEN OAKS



Army by Motor Cars

Soldiers Departing from Pensbury

Nearing Iontenden

Two Hundred and Eighty-Six Cars and Twenty-Eight Chassis Used in the Demonstration

the exception of section G, which had started direct from Chelsea barracks at 7:30 a. m.

The first column—that from the Wellington barracks—in which there were 143 cars, took up its position in the Crystal Palace park road. The second column, of thirty-three vehicles, was lined up in the Lawrie park road, and the third column, from the Chelsea barracks, consisting of 128 vehicles, included the first line of transport, and ranged in the Thicket road. All the thoroughfares on the line of route were thickly crowded with people, and the sight was a memorable one. Indeed, what with the smoky exhaust of many of the powerful vehicles, one could almost imagine that the actual engagement with the enemy had commenced. Although it was reported that on parts of the route snow still lay on the roads, the weather conditions, having regard to the time of the year, could not have been more favorable.

So splendidly had the arrangements worked that at 9:45 a bugle sounded and the signal was given for the first section of cars A to take their departure. One by one the vehicles passed under the bridge of Penge railway station amid lusty cheers. Following the As came the Bs and then the Cs, but owing to a little gap in the procession a slight muddle took place at this point, some of the D cars being sent away out of their order. However, the authorities soon got matters right again, and after that the vehicles were duly dispatched according to the program, the last to go being the very business-like turn-out of twenty-one light Napier lorries, forming the first line of transport. The end of the long line of cars was brought up by a miscellaneous collection of motor cars, including one belonging to a gasoline firm, loaded with oil.

The number of cars engaged, including those for the press, the officers, etc., numbered about 350, all of which were obtained through the agency of the Automobile Association.

Police and scouts acted in friendly cooperation—the one to keep clear the line of route, the other to direct drivers along the highway to Hastings. Everyone along the route took keen interest in the progress of the forces, and in order that the test might, so far as Sussex is concerned, be carried out without a hitch, the chief constable for East Sussex expressed his wish that the farmers and others should as far as practical refrain from hauling heavy wagons along the roads to be traversed between Flimwell and Hastings during the hours the experiment was being carried out. This request was carried out.

No passing was allowed, except in case of a breakdown, when the occupants had to get out of the car and enter the first spare machine, of which there were three, at the rear of each company of guards. The second line of transport, section G, had started from Chelsea barracks at 7:30 joined the same route as the main body at Farnborough. The distance from the Crystal Palace to Hastings is 54 miles, and as an average speed of 20 miles an hour was maintained, the first car arrived at 1 p. m.

Tommy Atkin Descending Poll Hill

Legal Lights and Side Lights

GRIM BILL DISCUSSED

THERE was a big outpouring of motoring lights at Harrisburg, Pa., last week when the house roads committee gave a hearing on the Grim bill, now before the Pennsylvania state legislature. S. Boyer Davis, counsel of the Automobile Club of Philadelphia, confined himself to the kernel of the problem and urged the killing of the present system of manifold speed regulations by passing the bill as it stands. This, he said, would bring about uniformity in that respect all over the state, and the motorist would not be placed at the mercy of officials of boroughs whose regulations varied almost with every milepost. President Robert P. Hooper, of the Automobile Club of Germantown, spoke on the grafting features of the present system, and urged that all fines go to the state. As now interpreted in many boroughs and townships, the motor laws were an incentive to unscrupulous magistrates and constables to graft, and he instanced the case of Magistrate Fitzwater, of Springfield township, who was ousted from his office by motorists. E. J. Kent, representing the Automobile Club of Pittsburg, spoke on the speed features of the bill, arguing that 15 miles an hour was not excessive speed—for a motor car—even on crowded streets. The motor car can be controlled so easily, he said, that it can travel three times as fast as any other vehicle and still be under such control that it can be stopped within its own length.

Opposing the passage of the bill, ex-Speaker Henry F. Walton, representing the commissioners of Lower Merion township, argued against taking away from the localities the power to regulate speed. He said the limit of 15 miles an hour where houses are less than 100 feet apart and of 24 miles an hour where they are more than 100 feet apart was a premium on reckless driving, and called attention to the fact that the bill would rescind the order of Philadelphia's Public Safety Director Clay compelling motor cars to stop at the near side of street crossings, or at least go so slowly that the car could be stopped in an instant. Walton also opposed the payment of motor fines into the state treasury and advocated more stringent regulations for the issuing of licenses to chauffeurs. He said the bill should either be amended in several important particulars or go over to the next session—2 years hence.

W. I. Schaffer, of Delaware county, although a motorist himself, admitted that there ought to be a state speed limit, but qualified by saying that localities should not be entirely deprived of power to make needful regulations. He feared that if fines went to the state treasury police officers would pay but little attention to infractions of the law. He said that if fines are taken away from the townships the citizens of Radnor township, which now pays $9,000 a year for police, and of Lower Merion, which expends upward of $15,000, would suffer in the matter of police protection.

When President Powell Evans, of the Automobile Club of Philadelphia, said the supervisors of Middletown township, Bucks county, refused to allow his club to erect warning "Blow Horn" signs at certain crossroads, Supervisor Buckman was on his feet with a denial. Mr. Evans repeated the charge, however, and said he was in a position to furnish proof, if necessary.

JUSTICES IN THE TOILS

After hearing the evidence of a number of prominent Philadelphia motorists, including ex-President Charles J. Swain, of the Quaker City Motor Club, and several members of the same organization, the grand jury of Camden county, N. J., last week found true bills against Justices William B. Wright, of Winslow Junction, and Justice Philip Schmitz, of Camden, on the charge of withholding fines imposed for alleged infractions of the motor vehicle law. It developed that since his preliminary hearing Squire Wright had endeavored to make restitution of the amounts involved. Squire Schmidt, after waiving a hearing, had tendered a check covering the amount said to have been withheld to Motor Vehicle Commissioner Smith. This evidence had great weight with the jury. Justice Conrad Waldvogel, of Camden county, recently sent to prison for 90 days for the same offense, completed his sentence last week and was released.

CHICAGO WHEEL TAX FIGHT

Illinois' legislature has been asked to amend the bill by which the municipalities are given power to pass ordinances legalizing the collection of a wheel tax, such a bill having been introduced at Springfield last Tuesday by Senator Pierson, of Chicago. If this measure can be put through, it will afford the motorists of the state relief and remove one of the danger spots on the road of motoring progress. The action is taken at the instance of the Chicago Automobile Trade Association, which is fighting the Chicago tax and which has gone right at the root of the evil. It is hoped that by a general uprising on the part of the car owners of the state that enough influence can be brought to bear at Springfield to rescind the measure. With this idea in mind the trade association is sending out a circular letter to each owner, in which it is asked that the legislators in that particular district be written to and called upon to vote in support of the Pierson bill. For the information of the owners there is a map of the state enclosed, on which is printed the representatives' names. The trade association also is scurrying around to get funds with which to fight. It already has $1,500, but needs at least $10,000. It is pointed out that motoring in Illinois is seriously menaced, for under the bill now standing any city or town can collect a tax for every car that passes through its streets. This is not done as yet, only residents having to pay, but there is no telling what will happen in the future. The Illinois legislature, on December 31, 1907, the last day of the session, passed an amendment to the motor vehicle act which permitted any municipality to enact a wheel tax ordinance immediately. Chicago was the first one to take advantage of this and collected something like $700,000. Since then other cities and towns have followed suit. The Chicago motorists attacked the legality of the ordinance, carrying the matter to the supreme court of the state, where they were beaten. Now they hope to beat the tax in the legislature.

COMPROMISE IN MARYLAND

The persistent opposition of the motorists of Maryland, headed by the members of the Automobile Club of Maryland, against what they declared was the special tax feature of the Swann motor vehicle bill, resulted in a compromise being reached which is satisfactory to both the motorists and the motor car commission of Maryland. The maximum and minimum tax figures of the old bill have been retained, but concessions have been made by both sides, and the bill, as it will now be ratified by the whole motor car commission, is practically the same as the Rhode Island law. This amicable condition of affairs was the outcome of a conference between the subcommittee of the motor car commission and representatives of the Automobile Club of Maryland. The figures agreed upon at the conference are as follows:

20-horsepower and not over	$ 6
Over 20 and not over 30	9
Over 30 and not over 40	18
Over 40	24

The Rhode Island figures are:

20-horsepower and not over	$ 5
Over 20 and not over 30	10
Over 30 and not over 40	15
Over 40	25

The figures in the original Swann bill were:

Under 10-horsepower	$ 6
Between 10 and 20 horsepower	12
Between 20 and 30 horsepower	18
Over 30-horsepower	24

Another change made in the original bill is the elimination of the provision naming

a state motor car commissioner and an assistant commissioner. The new bill will provide for one commissioner at a salary of $2,400 a year. If, in after years, the number of the cars in the state increases to the extent expected, it will be easy to amend the law so as to provide for an assistant. A number of minor changes were also made in the phraseology of the bill, which, Colonel Swann says, considerably improves it. The new bill also provides for a lighter tax on motor cycles than originally proposed.

JOKE BILL AT ALBANY

A bill which has caused much merriment among motorists has been introduced in the assembly at Albany, N. Y. The measure bears the name of Assemblyman Herrick, of New York city, and amends the motor vehicle law. The bill provides that on discovering an approaching team the motorist must stop off-side and cover his machine with a tarpaulin painted to correspond with the scenery. Approaching a corner a motorist "must stop not less than 100 yards from the turn, toot his horn, ring a bell, fire a revolver, hallo and send up three bombs at intervals of 5 minutes." Another provision requires motor cars to be seasonably painted "so they will merge with the pastoral ensemble and not be startling. They must be green in spring, golden in summer, red in autumn and white in winter."

Much interest is centered in Senator Hill's bill, introduced at Albany, amending the motor vehicle law of New York state so as to prevent the unauthorized use of motor cars. During an argument on the measure it was stated that certain hotels rented private machines left in their charge and that many garage owners took the same liberty. The bill provides that any garage proprietor allowing a car to leave the garage without the owner's consent is guilty of grand larceny, as is the so-called "joy rider," who appropriates the machine. The bill has been slightly amended, but not in its main provisions.

CHECK ON UNCLE SAM'S MEN

The Indianapolis police are attempting to regulate the speed of the two Overland mail wagons used by the postoffice in that city for collecting mail. Last week W. F. Kepner and Cleveland Jeffries, who drive the wagons, were arrested for fast driving after they had completed their runs. In police court each was fined $1 and costs. There is some question, however, as to whether or not the municipal authorities can interfere with the speed of the cars while they are in actual service.

MICHIGAN HAS TAX WAR

The Schantz bill, increasing the tax on motor cars in Michigan, is likely to cause all kinds of a fight in the legislature. The bill has been reported out by the committee which has had it in charge and now the farmer members of the legislature threaten to defeat it for the reason that the increased tax money goes to the state rather than to the county in which it is assessed. The farmers wish the money from the tax to be devoted to road work in the counties where the cars taxed are owned and operated. The objection is that the county provides no method for distributing it. The argument of the farmers is that the boards of supervisors may well attend to the distribution. Representative McNaughton, of Kent, will introduce an amendment to provide that the money go to the counties and that it be expended by the boards of supervisors. City dwellers are up in arms over the proposed increase in speed to be allowed motor cars. The speed limit, under the bill, is increased from 15 to 20 miles an hour and from 8 to 10 miles in the business districts. There is no objection to the increase in the business districts. The tax provisions of the bill have been amended slightly. Under the original provision cars up to 20 horsepower will be taxed $5 per annum, cars up to 30 horsepower $10 per annum, and all above $15 per annum. This has been amended so that the $10 will include 30 horsepower machines. Thirty horsepower is considered by the legislature as a sort of standard for touring cars and it was thought the great number of machines of this class should be entitled to the lower rate. The present rate for all machines is $1 per year.

ENFORCING SMOKE LAW

The gray-garbed guard of Fairmount park, Philadelphia, have been on the job recently noting the numbers on the cars which "emitted offensive quantities of smoke or disagreeable odors"—one of the crimes in the motoring calendar. Last Friday notices were served on a score or more of owners and drivers to appear before Magistrate Harris and show cause why they should not be mulcted to the tune of $5 and costs each. Those who could not plead "extenuating circumstances" were punished accordingly. The guards, it appears, differentiated between those which "smoked going uphill" and those which "smoked on the level." Those who were caught smoking going uphill were let off with a warning not to do it again. It developed that the majority of the infractions occurred on Tam o' Shanter and Sweet Briar hills, which are much used by demonstrators.

MILWAUKEE MAKES ANSWER

The answer of the city of Milwaukee to the injunctional proceedings instituted by the Johnson Service Co. of Milwaukee to prevent the purchase of a Peerless seven-passenger touring car for the use of the Milwaukee board of public works has been filed and is interesting manufacturers generally. No decision has been made. The Johnson company secured an injunction to force the board to advertise for competitive bids for a car instead of purchasing outright, and has tied up four or five similar purchases by other municipal departments. The city's answer says that better results can be obtained by purchase in the open market rather than by preparing specifications and buying from the lowest bidder. The city attorney goes into an exhaustive discussion of the industry and sets forth that similarly priced cars of different makes are generally totally different and that even experts cannot agree on the order of merit. Some cars are peculiarly suited for certain conditions, he says, and it would be difficult to allow for the fact in drawing up specifications. The answer also says that motor cars do not come under the head of "material and supplies," which must be bought from the lowest bidder, under the city charter.

COUNTY IS SUED

A case in which all owners are greatly interested is the suit recently brought by Reynold Mylott, administrator of the estate of Father George J. Vahey, a Cleveland priest, who was killed in a motor car accident at Kimball's bridge over Ten-Mile creek in Sylvania township, Ohio, August 8. The administrator asks $10,000 damages from the county commissioners, claiming it was due to their negligence that Father Vahey was killed. The petition, which has been filed in common pleas court, says that the deceased was in a motor car driven by Charles Pohlman, of Cleveland, and that on the Mitchaw road, near the bridge, there was a washout, known to the county commissioners. It is alleged that the car was proceeding at a speed of about 5 miles an hour when it ran into the washout, a hole about 5 feet in diameter, causing the car to turn turtle. Father Vahey was caught beneath the tonneau and crushed to death. Failure to repair the road and lack of guard rails along the embankment are cited as negligence on the part of the county commissioners.

FIGHT OVER ROAD FUNDS

Jackson township, Seneca county, Ohio, is the scene of quite a little tempest in a tea pot. A mandamus suit was recently filed there to compel the township trustees to issue bonds to the amount of $70,000 for road improvement. The trustees have filed a demurrer, claiming there was not sufficient cause for the filing of the mandamus suit. The plaintiff claimed that the trustees refused to act in the matter of road improvement. The courts will now have an opportunity to pass upon the rights of the case.

CAN EXTEND THE TIME

An important decision of the supreme court of Ohio holds that where a levy for road improvements has not produced enough in the period for which it was run to complete the payment of the cost, the commissioners may extend the period of the levy sufficiently to produce the required sum. The decision was rendered in a case which has been 2 years coming up from Franklin county.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

KNOWS OF HORSEPOWER FORMULA

NEW YORK—Editor Motor Age—On page 21 issue of March 25, Motor Age asks if any readers have heard of the following formula for determining the horsepower of gasoline engines: Square the bore, multiply by the stroke and number of cylinders and divide by 10. In one of the December, 1906, issues the Autocar published a similar formula except that the divisor was 16 instead of 10. I have used a similar formula for over 2 years, but use 12 as a divisor, which I think gives more accurate results than 10. Another advantage of using 12 is that it is divisible by 2, 4 and 6, so that for two-cylinder engines the formula becomes: square the bore, multiply the stroke and divide by 6; for four-cylinder motors it is the same, but 3 is the divisor, and in six-cylinder motors the divisor is 2. The above formula is just as simple as the A. L. A. M. one and more accurate in that it takes into consideration the length of the stroke of the motor.—J. J. Ide.

A KEROSENE CARBURETER

Indianapolis, Ind.—Editor Motor Age—In Motor Age, issue of March 11, page 29, I noticed that William Jarrett, of Plattville, Wis., wished information relative to the manufacture of kerosene carbureters. Motor Age stated it knew of none in this country. There is a floatless carbureter in which one can use either gasoline or coal oil, automatically, at any speed, made by William Carlin, Indianapolis, Ind. The only thing that is necessary in changing from gasoline to coal oil is to start on the gasoline and then turn off the gasoline after the engine is started and turn on the coal oil. The needle valve should be opened about double when the coal oil is turned on. This carbureter is especially adapted for stationary engines, but will work as well on motor cars, although the operator of a motor car would have to change his needle valve after turning on the oil, as the flow of the oil is much slower than gasoline.—A Subscriber.

A GLIDDEN SUGGESTION

Bardstown, Ky.—Editor Motor Age—I have the following suggestion to make for the Glidden tour, Detroit to Denver. Have the tour start at Detroit, going to Chicago, thence to South Bend, where Colonel George Studebaker, who will give a $5,000 non-repair trophy for this year's contest, lives; Kokomo and Indianapolis, where there are so many motor car factories, and where H. O. Smith, chairman of the A. M. C. M. A. executive committee, resides; French Lick Springs, the Carlsbad of America; thence to Louisville, the Abbey of Gethsemane, Lincoln memorial farm, which was visited by ex-President Roosevelt last February, and will be visited by President Taft later; Mammoth cave, the mecca of thousands of tourists yearly; and then via Evansville, St. Louis, Kansas City, Topeka and Denver. In case of a tie at Denver, the Gliddenites can have the run-off through Omaha and Lincoln to Chicago. In this way both routes between Chicago and Denver will be covered. Does Motor Age not think there would be more cars sold as a result of the tour via this route than through Des Moines, Lincoln and Omaha? Does Motor Age not think it would be very appropriate—and, I might say, patriotic—to touch the Lincoln farm in 1909, the anniversary of our martyred president's birth?—Claude W. Wilson.

From various rumors originating from Detroit and Buffalo it is practically assured that the Glidden tour will start from Detroit and go to Chicago, Milwaukee, Minneapolis, Omaha, Denver and Kansas City. It is undoubtedly the influence of large centers like Minneapolis, Omaha and Denver that has worked against the Kentucky route. Should this year's tour not go to Kentucky it would almost be a foregone conclusion that that of next year would enhance that section.

CHARGING STORAGE BATTERIES

Chicago—Editor Motor Age—I would like some information on charging storage batteries, and the care that should be bestowed on such. How do you test the storage cell, and how is a dry cell tested? Can dry cells be recharged at any time as a storage cell can?—D. B.

To test a storage battery, use an ordinary voltmeter—6 to 12 volts. When the voltmeter reads 2 volts, don't try and run more than 10 miles, but have it recharged. A 6-60 ampere-hour battery can stand a charge of 6½ to 7 volts on a direct current circuit by placing three 32-candlepower lamps in resistance with your direct current circuit. Always be careful to avoid having battery wires crossed when making connections. Do not permit the battery to remain discharged. A storage battery should receive a charge once in every 6 weeks regardless of the amount of usage given it, as regular charging preserves the battery. Care should be taken that the electrolyte should be ¼ of an inch above the plates at all times. Electrolyte should consist of diluted sulphuric acid of 1.250 specific gravity, which may be ascertained by the use of a hydrometer. Great caution should be taken that the charging is done in the proper direction; that is, the negative wire or the charging circuit is connected to the negative terminal of the battery marked, —, and the positive wire of the charging circuit is connected to the positive terminal of the battery marked +. The negative wire of the charging leads can be identified as the one causing the greater amount of bubbles after placing both ends, about an inch apart, in water containing a small amount of sulphuric acid. Rectifiers can be installed in most any private garage at a nominal cost. Also, a small electric plant can be installed to charge from 10 to 26-volt batteries at a time and run 16-candlepower lamps with 1 gallon for 5 hours. Dry cells cannot be recharged without being practically rebuilt. The storage cell is tested with the voltmeter, the dry cell with the ammeter.

WAS A WARNER DIFFERENTIAL

Rome City, Ind.—Editor Motor Age—Will Motor Age give me the address of the concern that manufactured the differential gear used on the 1905 18-horsepower Queen cars? About 1 or 2 years ago I saw advertised in this paper a small pocket expense book for motorists. What is the price and does Motor Age sell this book?—John W. Zimmerman.

The Warner differential made by the Warner Gear Co., Muncie, Ind., was used in the Queen model referred to. As to the expense book Motor Age cannot recall the advertisement of which you speak, but many insurance companies publish such a book, which usually may be had for the asking.

DIAGNOSIS WAS CORRECT

Lebanon, Pa.—Editor Motor Age—I often have seen in Motor Age, as well as other motor car journals, the question, "Why is my engine missing?" Various reasons are advanced for its cause, but I never have seen an answer that gave a particular reason for the engine missing. Such a trouble that came under my own observation was that of a friend's four-cylinder car, the engine of which, after a year's use, began to miss whenever on the road. In the garage, or when standing still, it would not hit on every cylinder, but as soon as on the road on high speed up grades it began to miss. The spark plugs were changed, coil adjusted, valves ground, mixture changed, and, in fact, all the popular stunts that are usually engaged in, were tried. Experts were baffled by the queer pranks of the engine

and gave up the job. Now, I do not wish to pose as an expert, as I have only been running cars for the last 4 years, during which time I feel I have become well acquainted with the mysteries of the gasoline engine. I told my friend that I was sure I had diagnosed the engine trouble and advised him that the exhaust valve springs were too weak, opening slightly on the suction stroke and admitting air, resulting in a poor mixture. Acting on this advice, my friend put new springs on the exhaust valves, which settled the whole difficulty. Now the engine works perfectly satisfactory. I relate this little experience, as it may be of benefit to some fellow motorist. —J. H. Cilley.

CLEAN BY DRY PROCESS

New Haven, Conn.—Editor Motor Age—I have on my car a rather expensive set of slip covers which I wish to have cleaned. Through the Readers' Clearing House will Motor Age recommend some reliable concern that does such work?—F. H. P.

These slip covers are doubtless made from either pantasote or macintosh goods and can be cleaned best by a reputable local dyer and cleaner who uses the dry process of cleaning.

FLUX FOR SOLDERING

Montezuma, Ia.—Editor Motor Age—I want to solder a cooling fan blade supporting arm ¼ by ½-inch, and wish Motor Age, through the Readers' Clearing House, to tell me what compound or acid is best to use as a flux.—W. E. McKee.

A good flux in all cases of aluminum soldering is either stearin, vaseline, paraffine, copaiva balsam, or benzine. Clean the aluminum surfaces by scraping, and then cover with a layer of paraffine wax as a flux. Then coat the surfaces by fusion, with a layer of an alloy of zinc, tin, and lead, preferably in the following proportions: Zinc, five parts; tin, two parts; lead, one part. Metallic surfaces thus prepared can be soldered together with any good soldering preparation. There are a number of firms now in existence, which manufacture a solder especially adapted for soldering aluminum with full directions as to its use; and it is believed that such a solder should be cheaper and give better satisfaction than a home-made composition. The names of reliable firms handling aluminum solder may be found in either the advertising columns of Motor Age or those of the Automobile Trade Directory.

TESTING LUBRICATING OIL

Gibson City, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age state the standard by which good lubricating or motor car oil should be judged when analyzed?—Vreeland & Barrow.

Do you refer to making a chemical quantitive analysis of oil or merely a simple test? Little can be judged as to the nature of an oil from its color. If the oil is cloudy it may be due to moisture, or perhaps the glue in the barrel was not dry when the oil was put in. A better test is to take a quantity of oil and add one-third the volume of lye to it and shake well. The lye will saponify the animal and vegetable constituents if they are present, but will not have any effect on the mineral constituency of the oil. This simple test shows whether the oil is a mineral oil or one compounded with vegetable or animal constituents. A very simple test of the viscosity is to fill a bottle with oil and tilt it so as to allow the oil to drop out. If the drops break away quickly the viscosity is low, whereas if they hang well and drop slowly the vicosity is high. The safest way in buying oils is to buy standard brands, manufactured solely for motor car use.

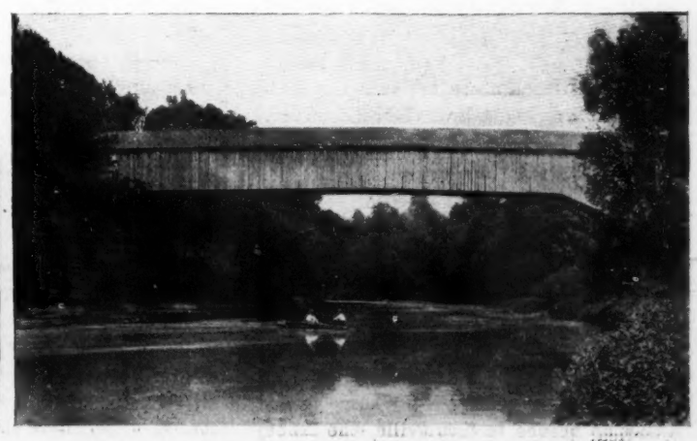
SELDEN'S OIL EXPERIMENTS

Oshkosh, Wis.—Editor Motor Age—I do not remember ever seeing in print any mention of a most important factor which has greatly assisted in making a success of liquid hydrocarbon engines of the explosive type; namely, the lubricating oil used in cylinders. Up to 1878 engines of this type could not be made to run successfully because the oils they used were composed of animal and vegetable fats, which carbonized and were of a rank odor. In 1877, and before that date, George B. Selden was attorney for the Vacuum Oil Co., of Rochester, N. Y. It is now a branch of the Standard Oil Co. In 1877 Mr. Selden obtained a sample of the then new mineral oil made by this company. The oil was termed "600 W" because it would stand a heat test of 600 degrees. Selden used it in his 1877 motor engine and in his early experiments of 1877 and 1878, and it made good. This was another witness for Selden in the Selden case and it cannot be impeached. This led the oil producers to experiment on oils which might stand high explosive tests and now we have mineral oils of various names and kinds made for the purpose. But give George B. Selden another credit mark. Perhaps I may be letting out a secret, but Mr. Selden has done something in connection with radium, which he secured in London some 3 years ago, that would cause some well known scientists to sit up and take notice should they be aware of it. Speaking of the long-sought-for front drive, perhaps a perusal of the Selden patent and drawings may show another review of his remarkable foresight. I stand ready to make a wager that inside of 6 years and 365 days from now there will be more high-wheel, hard-rubber tire machines in use in this country than pneumatic tire machines.—C. B. Hatfield.

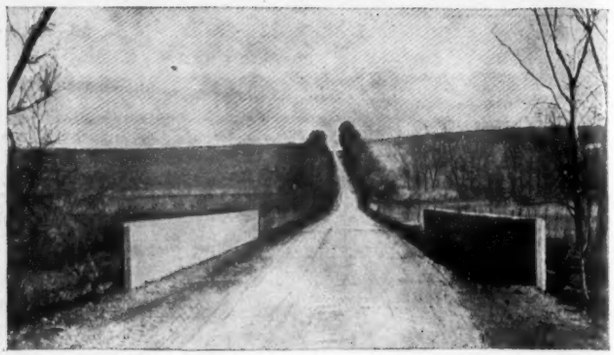
ON CARE OF DRY CELLS

Cleveland, O. — Editor Motor Age—There is considerable discussion on dry cells as current source for motor car ignition at the present time. Much of the trouble with the dry cell is that it is not used so as to give its full value. When motor cars were practically all equipped with the single-cylinder motor the dry cell was satisfactory for ignition purposes. The advent of the multiple-cylinder motor with higher compression increased the drain on the battery to such an extent that a single series of dry cells was hardly satisfactory. This drain on the battery is a variable quantity, due to the adjustment of the vibrator coils. A single turn of the adjusting screw often raises the current consumption to five or six times the normal necessary value. On multiple-cylinder motors if a series-multiple battery of dry cells is used the drain per

MAIN STREET, BARDSTOWN, KY.



RIVER SCENE AND BRIDGE NEAR BARDSTOWN, KY.



TYPICAL ROAD SCENES ON GLIDDEN ROUTE THROUGH NEBRASKA

cell would be reduced to a point where dry cells would be of satisfactory service. Fig. 1 shows a method of connecting up the cells in multiple series, the four cells in each horizontal row are connected in series and the four rows by the end wire W are joined in multiple. Fig. 2 shows a set of twenty dry cells similarly connected, being united in sets of five each in series and then the four sets joined in multiple. When cells are connected up in this way and the spark coils properly adjusted, satisfaction should result. In selecting dry cells for motor car ignition, do not select them on account of their spectacular initial showing. The initial amperage of a dry cell is, generally speaking, no indication of its available service life. They can be constructed to give high initial amperage, but such is generally at the expense of the service life. Dry cells should be chosen for the work they are intended to do, that is, a cell designed for ignition work should be given preference over cells designed for all classes of service, such as bell, telephone, etc. So far it has been found impossible, or at least impracticable, to build a dry cell which would be entirely satisfactory and economical for both easy service and heavy service like ignition work. There is no closely definable point at which dry cells should be discarded, because this is a variable point, the more severe the use or drain to which they are subjected the higher the point at which they should be discarded. Very severe cold weather will temporarily reduce the activity of the dry cells, but by moderately warming them thoroughly they will regain their activity. They should be warmed through and through, but should not reach a temperature to cause the sealing material on the top of the cells to run. —M. C. C.

DIFFERENTIAL STRAIN

Oil City, Pa.—Editor Motor Age—In the Readers' Clearing House of Motor Age, March 25, is an inquiry from Reader, Little Rock, Ark., in regard to the relative amount of strain on the differential in a divided rear axle of a shaft-driven car and in a chain-driven car where the differential is carried on the jackshaft, the horsepower, gearing and other factors being equal. If I do not misunderstand the inquiry, my opinion differs from the answer given and a short explanation will express my views on the subject. Where the differential is located in conjunction with the rear axle it receives the strain of the entire driving power of the rear wheels; whereas if located in conjunction with the jackshaft the strain is in proportion to the ratio of the driving and driven sprockets. For example: If the sprocket ratio is three to one with the smaller sprocket on the jackshaft the strain on the differential would be just one-third what it would be if it were located on the back axle.—J. L. B.

MORE GLIDDEN INFORMATION

Omaha, Neb.—Editor Motor Age—Having noted the particular interest shown in the proposed Glidden tour, which undoubtedly will run from Omaha to Denver, I take pleasure in submitting two road illustrations showing the nature of the roads in Nebraska. One shows a particularly fine macadam stretch near Omaha, and the other is an ordinary road in the state.—W. J. Kirkland.

GOOD TOURING IDEAS

Atlanta, Ga.—Editor Motor Age—Touring in the south has its differences as compared with touring in the north, so I will make the following suggestions to those who contemplate visiting our section:

Start well equipped. Carry chains for your wheels. Fifty feet of 1-inch rope, with blocks to go along with it, will not come amiss. If your car is in a ditch or sink-hole one mule can do more for you with such an outfit than four without.

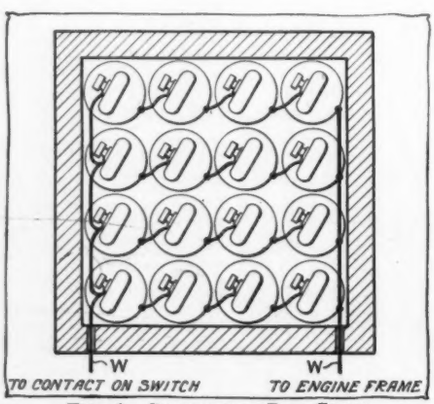


FIG. 1—CONNECTING DRY CELLS

Be prepared for tire troubles. Carry a couple of extra casings, a couple of inner tubes and patching materials.

Generate your own lights. You can get carbide most any place. You can get tanks at but few places in the south. And it is no joke to run out of lights.

Carry your own oil. You can get some kind of lubricant in any fair-sized town, but you can't always get the best. Carry an extra gallon or so if you are off on a long trip.

Carry an extra 10-gallon can of gasoline. Some places you can't yet gasoline at all. In the small towns they sell it to you by the quart, and you pay anywhere from 12 cents to 35 cents.

Carry your repair outfit. Be sure to have enough tools. You can't tell what you will need, and repair shops are not numerous in the south.

Don't plan to average over 100 miles a day. If you are out for fun, that is about as fast as you will care to go.

Don't light into the stretches. You never can tell where the bumps are until you hit them. Stick to a clip of 15 or 20 miles an hour.

Don't be afraid to run at night. It's safe enough, the coolest time of day and good fun.

Don't believe what a negro tells you about the roads. They hate to appear ignorant and will make up directions if they don't know them. When I pass a doubtful fork I always stop at the next house and ask if I am on the right road. Make it a rule to ask.

Don't trust a horse or a mule, especially a mule. You can't tell what they are going to do and less what their drivers are going to do. Some will make you stop while they unhitch and back their beast to one side. Then the beast will not bat an eye as you pass. The very next man you meet will sit like a statue in his wagon, watching you, while his mule runs away.

Don't honk when you are approaching horses or mules from the rear. Slip by them if you can. It never scares the nag.

Be polite to everybody on the road. Politeness is cheap and you never can tell who you are going to ask help from.

Be friendly. Have something pleasant

to say to the people you pass. It makes them feel better, and you, too. At present there is no ill feeling between the motorists and the farmers of the south, and there never should be.

Don't be afraid to tackle the fords. I never got in one yet that I couldn't get out.

Don't worry about a place to spend the night. You may not always get fine accommodations but you will always be taken care of.

Follow these tips and you will find touring in the south pleasant and interesting. People down here ought to go in for it more. This year I look for a lot of touring in the south.—R. D. Lambert.

FROM OMAHA TO DENVER

Denver, Colo.—Editor Motor Age—I noted in a recent issue of Motor Age a proposed route for the Glidden tour, from Omaha, Neb., to this city, and suggest the following route, which is to the south of the Platte river and is by way of Lincoln, Neb. It is a 4-day run, with night stops at Hastings, McCook and Fort Morgan:

Miles	
0	Omaha—Fine road to
31	Ashland—Fine road, much traveled by motor cars, to
24	Lincoln—Via Milford, Dorchester, Friend and Exeter, good roads, no hills as on direct route, to
55	Fairmount—Roads exceptionally good to
44	Hastings.
154	Night stop.
0	Hastings
54	Holdredge—Go west 4 miles, south to Orleans—Good roads—to Republican river bottom roads—level and good—to
23	Oxford—Noon stop, fine accommodations; good roads to
57	McCook.
134	Night stop. Plenty of beds, fine accommodations.
0	McCook—Excellent road to
11	Culbertson.
56	Imperial.
30	Holyoke—Noon stop.
50	Sterling.
35	Brush.
9	Fort Morgan—Night stop. Ample accommodations.
184	
0	Fort Morgan—Easy run of 4 hours over good roads to
78	Denver—Arrive for noon luncheon.

The Commercial Club of Imperial, Neb., is making preparations to entertain the Glidden tourists should the route be this way. A special meeting of the club was held last week and the following resolution adopted:

"Should the Glidden tourists decide to make Imperial a dinner stop, we will guarantee to feed the crowd, be that what it may, and should they be prevailed upon to stop with us over night we will guarantee to supply beds and food for at least 200, and our charges will be absolutely nothing. We wish to impress upon the Glidden tourists that the residents of Imperial and Chase county are alive and fully realize what it will mean to have a gathering of that nature pass through our country and partake of our hospitality."

The roads from Imperial to Holyoke, a distance of 40 miles, are ideal, and no better can be found in Nebraska. There is only one small hill, no sand, no culverts or bridges, and the road is almost in a direct line. A large part of it is over the old grade of the Burlington and Missouri River railway.—R. W. S.

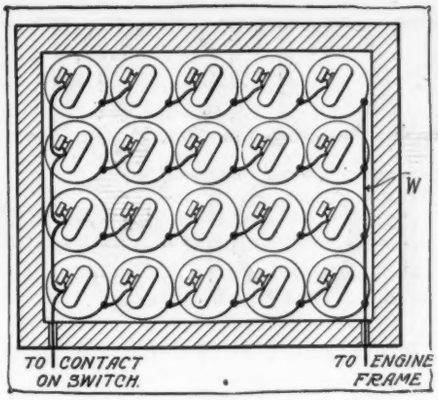


FIG. 2—WIRING DRY CELLS

CHICAGO-SOUTH BEND ROUTE

Chicago—Editor Motor Age—I read the reply to my letter in last week's issue of Motor Age, relative to the Chicago-South Bend motor route, which Motor Age promised to give me detailed information on request. I have two motor guides at home, and each one of them is different. The guide issued by the Apperson company leads out of Chicago by way of Halsted street through Roseland, Dolton, Oak Glen, Lansing and Highlands to Hobart, Chesterton, Burdick, Otis, Michigan City, New Carlisle and South Bend. In the White company guide, the route goes through South Chicago, Hammond, Highlands, Lake, Crocker, Chesterton and from there it is the same as the Apperson. If Motor Age knows of any route which is better than either of these, I would like to know it, because information received from Motor Age is always reliable. Also what causes an explosion in the carbureter after you have primed it?—W. C. P.

As to the two routes mentioned, the Apperson is a popular one with the exception of a bad stretch through the town of Dolton, while the White way is good save for the stretch from South Chicago to Wolf Lake clubhouse. In using the latter route do not go to South Chicago through Windsor Park. Instead take Jeffrey avenue at the south end of Jackson park, which runs to Eighty-third street, which carries you into South Chicago over a macadam road. Bond avenue in Windsor park, the old way, is in poor shape at the present time and should be avoided.

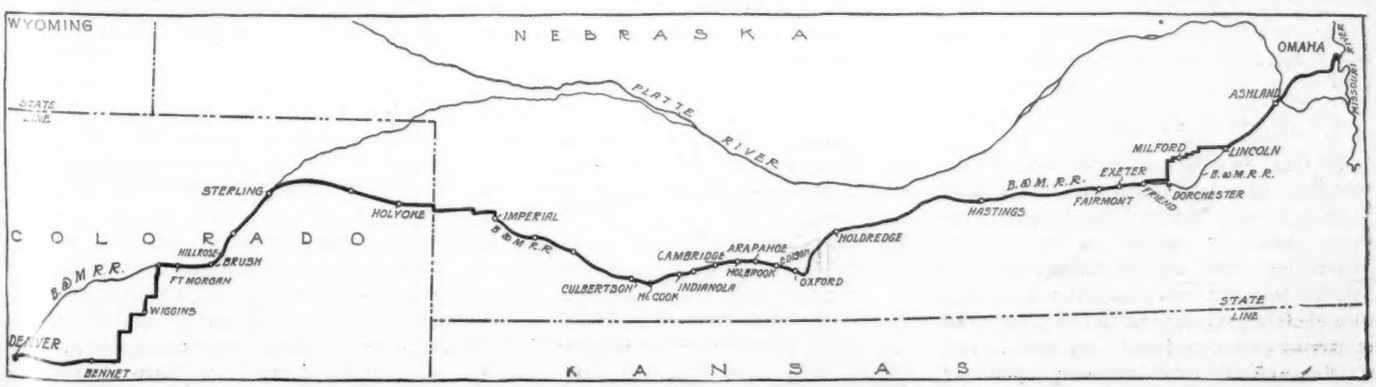
DETERMINING FLYWHEEL WEIGHT

Hutchinson, Kan.—Editor Motor Age—Will Motor Age tell what the weight of the flywheel should be for a four-cylinder motor with 3¾-inch bore and 3⅜-inch stroke, rated at 18 horsepower?—Subscriber.

If the speed of the motor and its degree of compression be known, the diameter of the flywheel or the weight of the flywheel rim may be readily ascertained from the following formula. The weight of the rim of the flywheel is the only portion which enters into the following calculations, the weight of the web or spokes and hub being neglected. Let M. P. be the mean pressure of the compression, and A the area of the cylinder in square inches. If S be the stroke of the piston in inches, and N the number of revolutions per minute of the motor, let D be the outside diameter of the flywheel in inches and W its required weight in pounds, then

$$W = \frac{M.P. \times A \times S \times N}{2560 \times D}$$

Motor Age is unable to answer your question owing to lack of proper data, so it submits the above formula.



MAP OF SUGGESTED GLIDDEN TOUR FROM OMAHA TO DENVER

The SELECTION of a RADIATOR

By Joseph E. Lewis, M. E.

Part III

THERE is frequent inquiry for a formula or rule by means of which to determine the proper capacity of the radiator for a motor of given cylinder dimensions and horsepower. It is a question, however, whether such a formula could be devised to do service under all conditions. Rules which might be applied to stationary gas engine practice would not be correct for motor car practice, and even in the field of the motor car conditions vary so much as to make any general and all-embracing rule impracticable if not quite impossible.

Such a formula cannot be based upon horsepower alone, since a 60-horsepower motor, for instance, does not necessarily require a radiator six times as large as a 10-horsepower motor. It cannot be based upon the cylinder dimensions alone, although perhaps the area of the inner walls of the cylinders exposed to the burning gases gives a closer measure of the heat absorbed and hence of the amount of radiation required than any other single element in the problem. The number of cylinders cannot be used for direct comparison, since, for example, a six-cylinder motor does not usually require 50 per cent more radiation than a four-cylinder, and a four-cylinder does not usually need four times as much as a single cylinder of the same dimensions.

The problem is further complicated by a variety of conditions with reference to the design of the motor as well as the speed of the motor, pump and fan, not to mention purely local and accidental condition, such as more or less faulty ignition, bad mixture, hot weather, muddy roads, mountainous country, and the skill or lack of skill of the driver.

Problem Complicated One

The problem is therefore a complicated one and hardly capable of exact mathematical solution. Certain general rules may, however, be laid down as the result of experience.

First—It is better to have the radiator considerably too large rather than to have it even a little too small. Undoubtedly every gas engine has its own temperature of maximum efficiency depending upon its peculiar design; and generally speaking, too low a temperature in the cooling water may result in some loss of efficiency. But it is manifestly inadvisable in motor car practice to try to govern conditions so as to maintain at all times the particular temperature which results in the very highest efficiency of the motor, since changing conditions of service and weather result in a wide variation of the temperature of the cooling water. It would not be impossible to devise a system by means of by-passes, etc., so as to always maintain the water at about, say, 180 degrees, or whatever temperature was desired, but this would result in an amount of complication hardly warranted by the value of the results. The main thing to lookout for is to see that your motor never overheats, and if the radiator is large enough to accomplish this result, one need not worry very much about the rest of it.

Second—A motor truck, or commercial vehicle, should preferably have a radiator of greater capacity than a pleasure vehicle having the same motor, for the following reasons: The truck travels more slowly and therefore does not create so much draft through the radiator, due to its motion as the pleasure vehicle; the truck, as a rule, operates with heavier loads and with greater power on the engine, and therefore heats more water; the shape of the truck radiator is frequently such that it is impossible to operate all of the surface with a fan, and the location sometimes partially obstructs the passage of the air; the truck is, as a rule, operated by less skillful drivers than the pleasure car; the truck is a business proposition with the owner, so that any delays, or troubles of any kind are a matter of serious consequence to the owner.

Radiation Philosophy

Third—Large cylinders require less radiation per horsepower than small ones, because the horsepower increases, roughly speaking, with the volume of the cylinder, that is, with the square of the diameter; while the heat radiated increases, roughly speaking, with the area of the cylinder walls, that is, in direct simple ratio with the diameter. The above statements are only approximately correct, but they form a safer basis for estimating the amount of radiation than the consideration of horsepower alone.

Fourth—The greater the number of cylinders of a given size the smaller the amount of radiation required per cylinder and per horsepower, probably due to the fact that the greater the number of cylinders the smaller the amount of work required of each.

Radiator builders sometimes publish tables of sizes of radiators suitable for motors of given power, and their recommendations are as a rule reliable for ordinary conditions because they are based upon the results of experience.

A good method of accurately comparing the capacities of two or more different radiators is to test them successively upon the same car with the motor running idle, and with the conditions regarding speed, regulation of spark and throttle, duration of test, etc., exactly the same for all radiators. The temperature of the water may be taken at any convenient point in the circuit, provided only that it be taken at the same point in all of the tests, since a comparison of temperatures is all that is desired, it being understood that the radiator showing the lowest final temperature at any given point in the circuit is the most efficient. It is usually convenient to remove the filler cap and insert the thermometer into the top water tank of the radiator in each case. This is a satisfactory way to do since it gives the temperature where the water is the hottest, as it comes from the motor into the radiator.

Temperature Will Increase

It will be found that the temperature will increase rapidly at first and more slowly afterwards until it reaches a maximum in from 30 to 60 minutes. After reaching the maximum point it will fluctuate within a few degrees of it during the remainder of the test. The greater the amount of water in the system the slower will be the rise in temperature, but the final temperature will be same for a given radiator regardless of the amount of water in the system.

It has sometimes been incorrectly assumed that a large amount of water adds to the efficiency of the cooling system, and not so very long ago water tanks of from 10 to 15 gallons capacity were carried. At the present time, however, the whole cooling system of an up-to-date car scarcely holds one small pailful of water, and new water is added only at long intervals to make up slight evaporation losses.

Radiator tests made on the road or with the motor running idle are of value an

may be relied upon in determining the size of radiator required for a given car. As a rule if one cannot boil the water with the motor running idle he will not have any trouble from over-heating on the road.

There are many things about radiators and their design which may be learned through laboratory tests, using apparatus similar to that described in Part II of this series. In such tests the temperature of the water may be taken both at inlet and outlet of the radiator and the exact quantity of water circulated per minute may be measured so as to compute the capacity of the radiator in heat units radiated. The results are somewhat surprising in that they show such a small amount of heat radiated per square foot of surface exposed to the air.

The most efficient type of cellular radiator tested radiated 760 British thermal units per minute when operated with temperature of inlet water 175 degrees Fahrenheit; outlet water, 158½ degrees Fahrenheit, air in the room, 76 degrees Fahrenheit; amount of water circulated per minute, 46 pounds; fan speed, 1,000 revolutions per minute. This radiator had a frontal area of cooling section of 356 square inches; total radiating surface exposed to the air of 70 square feet, and weighed 50½ pounds.

The number of British thermal units radiated per square inch front was, therefore, 2.13; per square foot of air surface, 10.9; per pound weight, 15. The average temperature of the water was 166¾ degrees Fahrenheit; that of the air, 86 degrees Fahrenheit, and the average difference, 80¾ degrees Fahrenheit. The heat radiated per hour, per square foot of air surface was 654 British thermal units, and the heat radiated per hour, per square foot, for each degree of the average difference between the air and the water temperatures was 654 divided by 80¾, or 8.1 British thermal units.

Comparison of Results

Compare this result with the heat transmission obtained in the small copper coil heater used to heat the circulating water. This heater had 5 square feet of surface exposed to the water on one side and to the steam on the other. The average temperature of the water was 166¾ degrees Fahrenheit, and of the steam, probably about 220 degrees Fahrenheit. The total heat radiated per hour by the heater was 45,600 British thermal units, all of which was transmitted from the steam to the water through 5 square feet of heating surface with an average temperature difference between the steam and the water of only about 53 degrees Fahrenheit. Therefore the heater transmitted heat at the rate of about 172 British thermal units per hour, per square foot of surface, per degree difference of temperature between the water and the steam. Compare this with 8.1 British thermal units for the radiator and we find that the heater operated at about twenty-one times the efficiency of the radiator, which is a very interesting fact to reason from.

In the first place, it should be observed that the thickness of the copper tubing between the steam and the water in the heater was about $\frac{1}{16}$ inch—0.0625 inch—as against a thickness of about 0.007 inch between the water and the air in the radiator. That is to say, the heat had to travel through about nine times the thickness of metal in passing from the steam to the water in the heater, as it did in passing from the water to the air in the radiator, and yet there was transmitted about twenty-one times as much heat per square foot of surface in the first case as in the second. It is evident, therefore, that the thickness of the wall of metal has very little influence upon the efficiency of an apparatus in the transmission of heat within ordinary limits. Hence, in a radiator, the thickness of the tubes or walls of metal separating the water and the air should be determined solely with regard to strength and other mechanical considerations.

One naturally asks why so much more heat passes through a square foot of surface in the heater than in the radiator. The metals were the same in both cases in the test referred to, namely, copper. It seems paradoxical that the wall which was nine times as thick as the other should transmit twenty-one times as much heat, and yet such was the fact. One would naturally suppose that the thicker the wall the less the quantity of heat that would pass through it in a given length of time, but evidently the thickness of the metal does not have very much to do with the matter, as already pointed out.

Explanation of Phenomenon

The theory offered in explanation of this phenomenon is that the principal resistance to the flow of heat from a substance on one side of a metallic plate to a substance on the other side of it occurs at the surfaces of the metal and not within the metal itself. The quantity of heat is also affected to a very large extent by the nature of the substances and the readiness with which they give up their heat to the metal.

Evidently steam gives up its heat to the metallic plate on one side faster than the water can absorb it on the other side, so that the capacity of the heater is limited by the ability of the water to absorb heat rather than by the ability of the steam to give it up, or of the metal to transmit it. In the case of the radiator the water will evidently give up its heat to the metal on one side of the plates or tubes faster than the air can absorb it on the other side, so that the capacity of the radiator is limited by the ability of the air to absorb heat.

In the light of the above conclusions it would seem that some types of cellular coolers are founded upon a wrong theory, since the object of their construction is to provide equal air and water surfaces and to bring the air as nearly into contact with the water as possible by means of very thin intervening metallic plates. But we have shown above that the thickness of the metal does not have any very great influence upon the efficiency of heat transmission, and since the water gives up its heat to the metal very much more readily than the air can absorb it from the metal it should be evident that there ought to be more air surface than water surface in a radiator designed upon correct principles. This is the theoretical basis of extended radiating surface as employed in the tube and fin type of radiator. It might be assumed from the foregoing that twenty-one times as much air surface would be required as water surface in a theoretically correct design, but this assumption is not warranted. The best practical results indicate that from five to eight times as much air surface as water surface may be used to advantage.

In the test of a cellular radiator, referred to above, the fan was operated at 1,000 revolutions per minute and the total heat radiated per minute was 760 British thermal units. Another test was made in which all of the conditions were exactly the same except that the fan was operated at 1,500 revolutions per minute. In this test the total heat radiated per minute was 1,000 British thermal units, an increase in radiation of 31.6 per cent, due to an increase in fan speed of 50 per cent. Several other radiators were also tested at both fan speeds. All of these were 3 inches thick and they showed an increase in radiation varying from 31 per cent to 36 per cent when the fan speed was increased 50 per cent.

Remedy for Over-Heating

This, perhaps, indicates a remedy for over-heating in some cases. If the fan is running at less than twice the speed of the motor and the radiator does not cool sufficiently, the trouble may be alleviated or overcome entirely by speeding up the fan to two and one-half times, or even three times, the motor speed. Of course, when the car is traveling at a speed of 20 miles an hour or more, there is little benefit derived from the fan, but it is quite possible that at this speed the fan may actually retard the passage of air through the radiator unless it is revolving at a speed which would correspond to an air velocity equal to that due to the motion of the car.

The speed of the pump or the amount of water circulated per minute has an important bearing upon the efficiency of radiation. In the tests above referred to the water was circulated at the rate of exactly 46 pounds per minute and the radiator was of a size suitable for a 24-30-horsepower motor. This is at the rate

of from 1½ to 2 pounds of water per horsepower per minute. The drop in temperature between the inlet and the outlet of the cooler was 16½ degrees Fahrenheit at 1,000 revolutions per minute of the fan and 21¾ degrees Fahrenheit at 1,500 revolutions per minute of the fan. Generally speaking, the more rapid the circulation of the water the greater the radiation, and while it would not be possible, theoretically, to circulate the water too fast, the best practical limit is 3 to 4 pounds per horsepower per minute for motors up to 40 horsepower, and 2 to 3 pounds for larger motors.

Proper Thickness of Radiator

The proper thickness for a radiator is a subject upon which several series of tests have been made by the writer. It is a well known fact that the front area counts for more than thickness in producing radiation. Radiators are nowadays made 3, 3½ and 4 inches thick, but seldom thicker. The thickness of a radiator of the cellular type should bear a certain relation to the size of the air cells, and in the tube and fin type to the spacing of the tubes and fins.

Two cellular radiators with relatively large cells—about ⅛ inch square—one of them 3 inches thick and the other 4 inches, were tested under the same conditions, the only difference being the thickness of the radiators. The 3-inch radiator showed a drop in temperature between inlet and outlet of 16 degrees Fahrenheit, and the 4-inch cooled, 18.5 degrees Fahrenheit, or an increase of only about 15 per cent, although the 4-inch cooler had 33⅓ per cent more radiating surface than the other. In other words, the 3-inch cooler showed about 87 per cent of the capacity of the 4-inch cooler. Cellular radiators with cells ¼ inch square, or smaller, would show a smaller percentage increase in capacity, due to the increase in the thickness.

A comparison was also made between 2-inch and 3-inch radiators of the vertical tube and fin type. Both radiators were tested under the same conditions and the 2-inch radiator radiated over 80 per cent as much heat as the 3-inch one.

Manufacturers' Communications

Syracuse, N. Y.—Editor Motor Age—The prospective run from New York to Seattle is directing attention to across-the-continent contests, but we would have a run both longer and more exacting than this. We would have rigid rules absolutely prohibiting repairs and thus making the event an endurance and reliability contest rather than a race, whereas those in charge of the race to Seattle plan to have as few regulations as possible, the idea being to get the car through to the finish in quick time, even though in a battered condition. Our view of what such a contest should be: a reliability contest in which the competitors shall drive their motor cars from ocean to ocean and back again. Reliability and endurance competitions are constantly increasing in rigidity, and a round-trip with the eastern and western coast of the country as its limits is a logical outcome of the present tendency. If the Glidden tourists this year go to Denver a long step will be taken in making motorists realize the immediate possibilities of the great transcontinental run as a test of the staying qualities of a motor car.

It is 5 years since Whitman and Carris in a 10-horsepower Franklin runabout shattered all records by making the run from San Francisco to New York in 32 days, 23 hours and 20 minutes. Two years later they cut the record in two, crossing the country in a Franklin in 15 days, 2 hours and 12 minutes, and this record stands today for the transcontinental run.

Those trips were demonstrations of endurance, of ability to overcome all sorts of road conditions and do it in good time. Since their time the reliability contest has developed, having a constantly increasing stringency of rules and requiring a constantly higher standard of road performance.

It remains for the great American reliability contest to be established. The route is practicable; it is hard, but it provided a fair test of a motor car under all sorts of conditions and on a trip sufficiently long to ensure a thorough demonstration.—H. H. Franklin.

SHOULD LOOK OVER TIRES

Youngstown, O.—Editor Motor Age—Tires held over winter should have a thorough overhauling before put into use in the spring. All small cuts should be repaired, and any weak places in the fabric should be reinforced.

The insides of the cases should be thoroughly brushed out, and new plungers or insides put into the valves in the tubes. Inflate the tubes and test for slow leaks at valves and splices. If the car has been jacked up and the tires deflated, they will be found to have deteriorated very little. But if the car has rested on the tires all winter the fabric may be expected to show creases at the points of contact with the floor. The tubes also will be found to have deteriorated and are liable to show cracks where the case is creased. If repairs are needed be sure to go to a first class repair man. If the quality of the rubber is first class the deterioration is very slow, and the tires may be repaired and retreaded. But if the rubber is hard and brittle, the deterioration is very rapid, and any vulcanizing done will be practically useless. Keep the garage floor free from oil and grease. If the surfaces of the tires are oily the rubber will become soft and wear away very rapidly, and any attempt to vulcanize or retread the tires will result in their complete ruin. Keep the tires well inflated. This is probably the most important rule that can be given as to the care of tires. Do not subject the tires to hard blows, such as striking curbs, running over rocks or ruts in the road at high speed. This not only injures the tires but is hard on the whole car. Never make a run into the country without extra tires and tubes. Do not run your tires flat after you have a puncture. It means a new tire at once, or in a very short time, as the fabric is certain to be torn or cut. There is no more economy in cheap tires for your car than in cheap shoes or clothes for yourself.—Republic Rubber Co.—T. J. Mell.

TIRES ON SHOW CIRCUIT

Akron, O.—Editor Motor Age—The race for supremacy that has been on for the past four years between the one-piece clincher and quick-detachable rims seems to be nearing an end, with the quick-detachable winning out, hands down. Taking as a basis fourteen motor cars, shows held in the principal cities of this country since the opening of the Palace show in New York city, January 1, there have been on exhibition 1,885 cars. One thousand three hundred and seventy-one cars, or 72.73 per cent, were equipped with quick-detachable rims, divided as follows: Goodyear quick-detachable, 40.2 per cent; Diamond Marsh, 30.4 per cent; Goodrich, 14.3 per cent. The balance was divided among eleven different makes. The Goodyear quick detachable rim led in eleven out of the fourteen shows.—G. W. Stadleman.

GIVE TIRES ATTENTION

Akron, O.—Editor Motor Age—It is advisable before starting to use tires that have been stored on the rims over winter, to remove the tires, sandpaper the rims thoroughly and cover them with a coating of aluminum paint. Any rust or rough edges should be removed to prevent danger to the casing and tube. The tires should be gone over thoroughly, and any cuts or injured places should be repaired before putting the tires in service. Tubes should be removed from the casings and a supply of French talc should be applied on the inside of the tire.—Goodyear Tire and Rubber Co.

News from the Motor Clubs

Club for Marshfield—A club is to be formed at Marshfield, Wis., as the result of agitation started by the Milwaukee Automobile Club, which is leading the fight of the Wisconsin State A. A. for better highways in northern Wisconsin. All of the wealthy lumbermen of Marshfield own cars and organization is expected soon.

Minneapolis Club Meeting—The annual meeting of the Minneapolis Automobile Club will be held Monday evening, April 5, at the Hotel Plaza. Reports of officers will be heard. A change in the annual dues and the adoption of an initiation fee and the changing of the fiscal year of the club are some of the more important matters to be considered. Four directors will be elected, as the terms of office of Dr. C. E. Dutton, George H. Seeley, Harry E. Pence and G. M. Gillette expire. After the meeting, which is the only occasion during the year when the entire membership of 800 gets together, there will be a buffet supper served.

Glidden Side Issue—The newly-organized Trinidad Motor Club, of Trinidad, Colo., has set to work with vigor and enthusiasm to make its city a motoring center. Its first promotion event will be the Part-Glidden tour, a run from Trinidad to Denver, the plan being to arrive in the latter city in time to welcome the Glidden tourists. The route is not yet definitely decided, but it will probably be through La Junta and the cities of the Arkansas valley. A stop of half a day will be made at Colorado Springs. Motorists in the towns along the route have promised to join in the tour, and it is probable that fifty or more cars will be in line when Denver is reached.

Hartford Club Meeting—A dinner of the Automobile Club of Hartford was held Friday evening at Hartford, Conn., about 150 members being present. The committee's recommendations for the enlargement of the club provided for the securing of a clubhouse, centrally located, allowing the annual dues to remain $10, but the committee further recommended that an initiation fee of $5 be charged. What caused most of the rumpus was the committee's suggestion that office holding in the club be restricted solely to owners and members not in any way allied with the industry in any professional capacity. R. D. Britton, a local dealer, moved to table the resolution. He withdrew his motion in favor of Harrison B. Freeman, Jr., who moved to postpone indefinitely. Five members of the committee were allied with the industry in one way or another. The committee also recommended that the club be incorporated under the laws of the state of Connecticut, the employment of a permanent assistant secretary with headquarters at the club, to be a source of information to tourists.

Oklahomans Plan Tour—The Oklahoma Club, of Oklahoma City, Okla., is planning to hold an endurance run early this spring from Oklahoma City to Denver, and a meeting will be called soon to discuss the matter and decide upon some definite plan.

Rides for Legislators—As a mark of appreciation to the members of the Utah legislature in passing the recent good roads bill, the Salt Lake Automobile Club recently was the host to a large number of legislators in a ride through the city. The guests and their families filled a score or more large touring cars and were whisked about the city at a rate of speed that on any other occasion might have resulted unpleasantly for the owners.

Tudor Succeeds Speare—When L. R. Speare was chosen as head of the A. A. A. he resigned his position as president of the Bay State A. A. of Boston. At the meeting of the board of directors last week Frederick Tudor was chosen president of the club. Mr. Tudor was one of the first secretaries of the Massachusetts A. C. and worked hard to increase its membership. He was chosen head of the Bay State A. A. because he was not in any way affiliated with the motor trade and so it is expected that there will be no factional strife in the club. Mr. Tudor was the first man to secure a license from the highway commission to operate a motor car in Massachusetts and his car was the first one registered under the law and ever since he has held number 1, of which he is decidedly proud.

Gophers Will Talk Roads—Following the annual meeting of the Minneapolis Automobile Club on Monday night, April 5, the Minnesota State Automobile Association will hold its annual meeting also at the Plaza. Louis Hill, of railroad fame and newly appointed member of the state highway commission, and George Cooley, also a member of the highway commission, and others, will read papers on various phases of the good roads question and the sign posting work being conducted by the association. Reports of officers and the annual election will wind up the evening. The present president, Colonel F. M. Joyce, is convinced that in order to really accomplish much along the good roads idea that the state association will have to have at least thirty strong, well organized and influential clubs 2 years hence, so as to accomplish the desired things when the legislature next convenes. Already there are nineteen clubs in the association and there are applications in from seven other towns where clubs are desired. These will doubtless be organized and admitted to the association within the next 6 weeks.

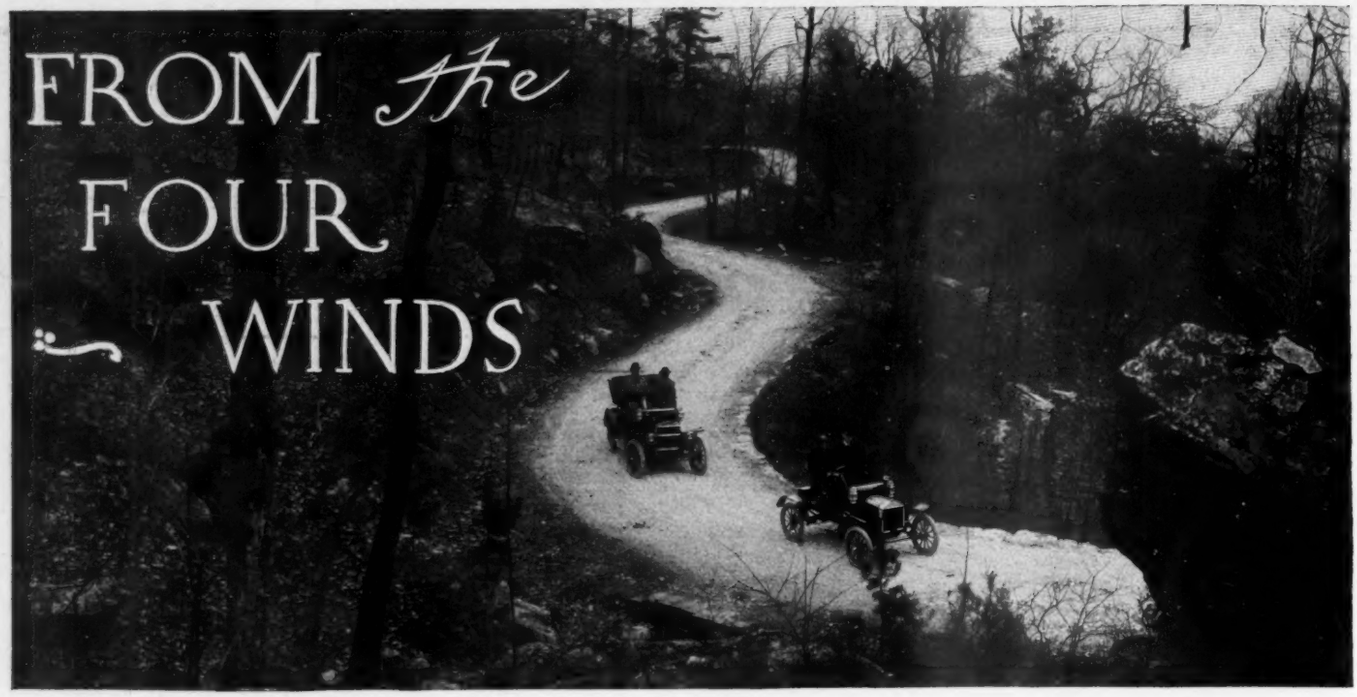
Long Branch Has a Club—The Long Branch Automobile Club, of Long Branch, N. Y., has been organized with the following officers: President, Dr. W. K. Campbell; secretary, Dr. Carl McDermott; treasurer, Milton J. Goldstein. The present membership is only fifteen, but efforts will be made to enroll all the owners in the city as members. There are fifty or sixty owners at present in Long Branch and many others promised.

New Southern Club—The Lookout Mountain Automobile Club, of Chattanooga, Tenn., has been admitted to membership in the Automobile Association of America. C. T. Alexander has been elected president, C. E. James and J. B. Pound are the vice-presidents, M. Daly, passenger agent of the M. K. and T. railway, is the secretary, F. G. Joyce, of the Joyce Automobile Co., is treasurer, and George E. Gill is the chairman of the contest committee.

Obstacle Race Planned—The announcement by the Automobile Club of Maryland that it is considering tours and contests for the spring has brought forth a number of suggestions from enthusiastic motorists. The latest and one which is meeting with much favor is an obstacle race. The idea is to have along the route selected for the cars obstacles, such as barrels, etc., placed at distances apart that will allow a clearance of only a few inches for the car. As the time consumed and the obstacles knocked over would both be taken into consideration, the skill of the driver would count practically for everything in such a contest.

Washington Reliability—The Automobile Club of Washington has been granted a sanction by the A. A. A. for a reliability sealed bonnet contest to be run May 15. The course selected is 171 miles in length, taking in two states and passing over two mountain ranges. The route is Washington to Rockville, to Frederick, to Hagerstown, Md., to Waynesboro, to Buena Vista Springs, Pa., to Emmitsburg, to Westminster, Md., to Washington. The contesting cars will be divided into four classes and the winner in each class will be given a valuable trophy in the shape of a cup. R. B. Caverly has been selected as referee of the contest, while H. C. Hunter and Fulton R. Gordon will be the judges. This is the first contest the club has ever given by itself and the officers are working with might and main to make it a big success.

FROM the FOUR WINDS



LOOKOUT MOUNTAIN, WITH A 4-MILE ROAD THAT WILL BE USED FOR HILL-CLIMB APRIL 22

De Luxe in San Antonio—An interesting photograph recently was taken of a De Luxe car in front of the San Jose mission in San Antonio, Tex.

Another Regal Run—A reliability run from Milwaukee to Detroit and return is being arranged by the representatives of the Regal-Detroit. It is planned to take a party of four in a Regal 30 about May 1.

Shanghai After Hose Wagon—The Shanghai municipal council, Shanghai, China, invites tenders for the supply of a motor fire hose wagon. Specifications and particulars may be obtained upon application to Fearon, Daniel & Co., 96 Wall street, New York city, to whom sealed tenders should be addressed not later than April 15.

Schenectady Ambitious—The Schenectady Automobile Club, of Schenectady, N. Y., will hold its annual meeting probably on April 6, when officers for the year will be elected and club trips planned for the summer months. It is probable that at least one long trip, covering 4 or 5 days or a week of steady touring, will be run off by the club this summer.

Worried Over Roads—Division Engineer McCloud, of Binghamton, N. Y., will consult at an early date with a member of the New York state highway commission in regard to good road improvements in that vicinity. Mr. McCloud says that in his opinion the day of macadam road is nearing an end. Some more durable material will have to be used in the construction of improved highways and the commission already is experimenting in an effort to find a way to construct roads that will stand any traffic and yet be kept within a reasonable construction figure. Vitrified brick roads, that is, roads constructed of macadam with a vitrified brick wagon track in the center, are now being considered.

Potter Goes to Nevada—Isaac B. Potter, former president of the American Motor League, who has been practicing law in Denver since last July, has removed his family to Goldfield, Nevada, and will make that city his future home.

Try to Ditch Car—A motorist complained to the police of Lestershire, N. Y., recently that two men had thrown a heavy timber in front of his touring car as he was approaching that village. The men did not wait to learn the outcome of their act, but hurried down a side street. The car was going at a fast clip at the time and was nearly ditched as it struck the obstruction.

Milwaukee Glidden Crazy—Civic and business organizations of Milwaukee have enthusiastically taken up the cry, "The Glidden Tour Must Pass Through Milwaukee," and a meeting was held this week by representatives of the Milwaukee Automobile Club, Wisconsin State Automobile Association, Milwaukee Automobile Trade Association, Merchants and Manufacturers' Association, Citizens' Business League, Greater Milwaukee Association, the Federation of Milwaukee Civic Societies and others to draw up resolutions to the committee in charge of the big motor event. Milwaukee people believe they are entitled to the tour this year, and the request that the route be laid throug' this city, with an overnight stop, has been turned into what is veritably a demand. The associations will accede to almost any demand made by the Glidden tour committee. Minneapolis people are cooperating with the Milwaukeeans and Madison and La Crosse are plugging hard. A fund will be raised to care for the expense.

Grading 500-mile Boulevard—Four hundred men will begin grading on the new 500-mile boulevard between Valdez and Fairbanks, Alaska, as soon as the snow leaves. It is expected that the road will be cleared enough to enable machines to travel between the two cities by this fall and that within 2 years it will be possible to use motor cars and heavy freight outfits the year around.

Youthful Enthusiast—The "Locomobile baby" of San Francisco, Cal., is Mercedes California Anderson, the daughter of Joseph S. Anderson, a Locomobile owner of that city. The youngster is only 13 months old, yet holds all long distance baby motoring records, having traveled in her young life more than 20,000 miles in her father's Locomobile. Before she was 4 months old she made two strenuous round trips from San Francisco to Los Angeles.

Will Climb Mountain—Chattanooga's climb up the historic Lookout mountain has been set for April 22, and great preparations are being made by the Lookout Mountain Automobile Club. The contest has been given the support of the Chattanooga chamber of commerce and six handsome trophies have been donated by the large commercial and social organizations of the city. The program will include contests for seven different classes of stock machines and a free-for-all. Lookout mountain stands over 2,000 feet above the city of Chattanooga, and the climb will be from bottom to the summit, a distance of over 4 miles. The course is replete

with hairpin, triple S and W turns, and is declared to be the most dangerous and difficult climb ever scheduled.

Elmira Prospering—It is said that Elmira, N. Y., this summer will have the largest number of motor cars in its history. At present there are upward of 250 motorists in that city and the number promises to reach the 300 mark later this year.

Voters Will Decide—The proposition of adopting the county road system in Gogebic county, Mich., will be submitted to the voters at the spring election April 5. If the proposition is adopted the county will spend $20,000 annually in improving the roads. The county road system is in effect in a number of counties in the upper peninsula and there are already scores of miles of scientifically-built highways which take rank with the best in the United States.

Tests Anti-Dust Compound—The Milwaukee board of public works is making exhaustive tests of a new anti-dust preparation on the city streets. The preparation is 25 per cent calcium chloride and 75 per cent water, and is distributed in a 600-gallon sprinkling wagon. Inopportune rains have made tests thus far short-lived. The compound retains its moisture 3 to 4 days. The chloride prevents it from freezing in a temperature above 17 degrees above zero. Its cheapness has attracted the board. No decision as to its permanent use will be made until perfect tests can be made.

Eleven Times for Diamonds—"The running of a motor car from the Atlantic to the Pacific was considered a wonderful thing when first accomplished in 1903. There have been at least fifteen such trips, all told, since then. This is the eleventh time Diamond tires have been the equipment of cars making transcontinental runs," says Theo. Weigele, of the Diamond Rubber Co. His reference is to the car now marking the course for the New York to Seattle test next June. The tires used are of the Diamond quick detachable type, 36 by 4 front and 36 by 5 rear, the same as were used on this Thomas car in the New York-to-Paris race last year.

Centurion Given a Ride—That the motor car is being appreciated by the older generations as a pleasant means of conveyance from one place to another is shown by the delight which Mrs. Franklin D. Cottle expressed when she was taken for a ride, on the one hundredth anniversary of her birth, in a Lozier touring car. Just before luncheon Mrs. Cottle started for her ride through the park and up Riverside drive, and on her return pronounced it the most enjoyable part of the full day's program which was prepared for her entertainment at the home of her daughter, Mrs. E. F. Evans, at 341 West Fifty-first street, New York city. She insisted upon taking her seat behind the steering wheel and remarked upon the difference between the means of locomotion of the present day and in the older days when she traveled across the continent to California in 1852.

Car for Chief Regan—The Buffalo aldermen have voted to spend $3,000 for a motor car for Superintendent of Police Regan of that city. He said he could get along personally without a car or horse either, but that a machine would increase the efficiency of the force.

Will Make Street Sweepers—Street sweepers, propelled by gasoline motors, and possibly a line of gasoline motor cars will be manufactured by the Keyes Sweeper Co., which has just been organized at Muncie, Ind., with $20,000 capital stock. The directors and principal stockholders of the new concern are: John S. Ellis, Erasmus L. Keyes, John O. Rotter, Carl Smith, Harry W. Moore, William F. White and Earl L. Clevenger.

Change in Roads—Motorists who use the highways in the vicinity of Buffalo will be interested in the report that the supervisors' good roads committee in that city has decided in favor of changing the route of the road from Brant to North Collins so that instead of running 1 mile south of Brant, then east to North Collins, it will go direct from Brant through Farnham to North Collins, not using the Mile-Strip road. The route is only a short distance from Buffalo.

Crafty Chief of Police—The chief of police of Zurich, Switzerland, recently applied to the officers of the Zurich Automobile Club for the loan of six cars. More than a score of the members volunteered their services and half of them were requested to be at police headquarters at 5:30 p. m. for an all-night service. Promptly at 6 the chief of police and half a dozen policemen in citizen clothes took seats in the cars and a night tour of the city streets and into the suburbs took place. The chief desired to ascertain how the traffic regulations were being observed by the drivers of horse-drawn vehicles. A record was kept and out of about 200 drivers that were observed thirty-three were stopped and later fined because they carried no lights, while one drunken driver was arrested.

Indianapolis Satisfied—In his annual report for 1908, City Controller George T. Breunig states the cost of maintaining the motor cars used by the Indianapolis police department. Last year the department had a steam touring car, a gasoline runabout and a gasoline patrol wagon in constant service, night and day. The cost of gasoline and all repairs during the year was $2,493.97. The department has recently ordered an additional patrol wagon and a gasoline touring car to cost $2,500 and $3,700 respectively.

Chance for Charitable—Major Gearing of the Salvation army, of Rochester, N. Y., has been impressed with the advantages that would accrue if there was a motor car at the disposal of the organization in that city. The Salvationists want a car that would carry five or six persons, who would visit suburban places for evangelistic purposes. Major Gearing says it would be a splendid thing if some one who contemplates purchase of a new car would make it possible for the Salvation army to have the discarded one.

Reverses 20 Miles—An unusual feat was recently performed by a Franklin 28-horsepower touring car at Kansas City when it was driven backward for 20 miles over country roads, the last 5 miles including the ascent of the Dodson hill. The distance was covered in 3 hours 7 minutes. The finish was 12 miles from the start by direct road, and on completing the test the five occupants changed the direction of the motor car from backward to forward and were whirled back to Kansas City by the shorter route in 24 minutes. Measurement of the backward run was accomplished by changing the right front wheel, carrying the speedometer gear, to the left side, this making the speedometer register as it would ordinarily with the car going forward.

DE LUXE TOURISTS IN FRONT OF SAN JOSÉ MISSION AT SAN ANTONIO

Development Briefs

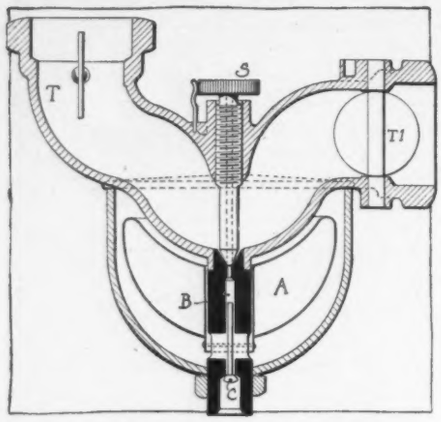


FIG. 1—KALAMAZOO CARBURETER

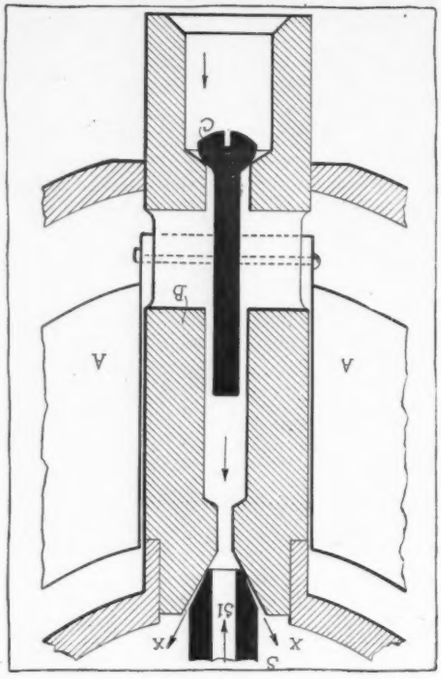


FIG. 2—KALAMAZOO CARBURETER NOZZLE

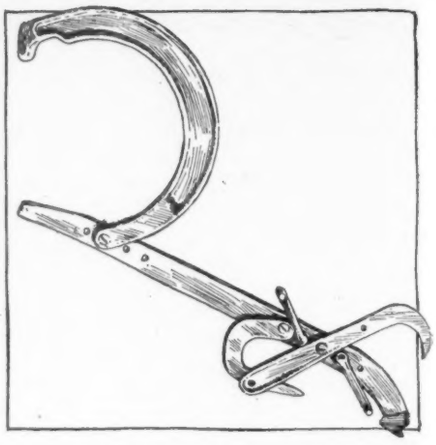


FIG. 3—UNIVERSAL TIRE REMOVER

MILLER'S SHOCK PREVENTER

A NEW shock absorber is Miller's double hydraulic and expanding friction type, illustrated in Fig. 4. It consists of a cylinder C connecting by universal joint V to the car axle and by a similar joint VI, the plunger, acting within the cylinder, is connected to the frame. Inside of the cylinder is the plunger P within which is a conical bushing, at the top and bottom of which are 1-inch semi-steel disks D. Through the piston passes a spindle S carrying a bead E and spring F on it. When the car rises the cylinder C rises until the bead E contacts with the disk D, the glycerine beneath the piston P being forced through the bored piston and escaping through the outlet H into the space above the piston. Should the shock be sufficient to lift the car above this point, the fluid, forced through the piston and the outlet H over the disks, expands causing a friction, after which the piston moves downward through the liquid in the cylinder. When the rebound occurs the piston slowly rises in the cylinder, its movement resisted solely by the liquid, the speed of upward movement being determined by the rate of flow through the outlet. This shock absorber can be attached to any style of spring.

KALAMAZOO CARBURETER

The carbureter shown in Figs. 1 and 2 is the Kalamazoo, manufactured by the Kalamazoo Carbureter Co., Kalamazoo, Mich. This carbureter is of the Venturi tube, central float feed type, with a principle well known in hydraulics but heretofore unused in carbureter construction, and for which easy starting, and a proper mixture at various speeds is claimed. It is supplied with both vertical and horizontal engine connections and has a butterfly-valve at each end of the main air passage—one T for throttling the engine and the other T1 to reduce the proportion of air and produce a rich mixture for starting in cold weather. The float A, which is made of copper, is concentric with and guided on the polished outside surface of the gasoline jet B; and operates the float valve C, which consists of a pin with a spherical head. This valve closes with the pressure; both valve and seat are burnished; and to insure against particles of dirt lodging on the valve seat, several thicknesses of fine wire screen are provided. The aforesaid hydraulic principle used in connection with this carbureter is that of the air lift, used by hydraulicians in pumping deep wells, and is confined to the gasoline regulating screw S. This screw is a tube inserted in an enclosing well, as shown in Fig. 2. Upon the formation of a partial vacuum in the main air passage by the suction of the motor, a downward air current is created through the tubular space S1 of the adjusting screw, and an upward current in the gasoline jet as shown by arrows X. This produces a gaseous mixture which is drawn up into the main air passage where it is more thoroughly vaporized. The regulating screw S has a graduated dial head with a retainer spring to hold it in adjustment; fittings are provided so adjustments can be made from the dash. The float is adjusted so the point of the adjusting screw is slightly immersed—to make the carbureter sensitive at low speeds and when cranking. Either the horizontal or vertical opening of the carbureter may be connected to the intake pipe of the motor, as it is immaterial in which direction the current passes through it. Screw or flange connections are furnished, with throttle levers opening with a push or a pull, and in any direction.

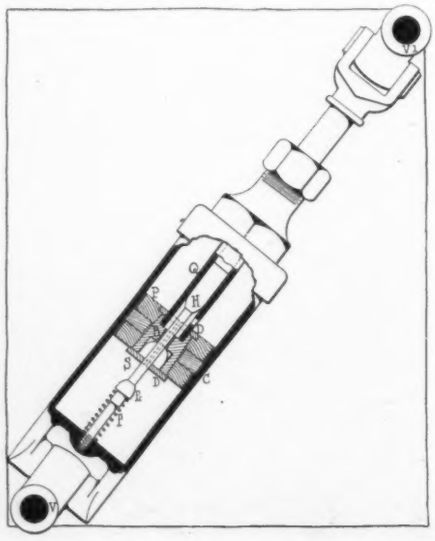


FIG. 4—MILLER SHOCK ABSORBER

HOTCHKIN SHOCK ABSORBER

The Hotchkin Mfg. Co., Chicago, Ill., is marketing its Hotchkin shock absorber in practically the same form as a year ago. The shock-absorbing medium in this device is liquid glycerine contained in a cylindrical compartment or drum carried on the side of the car frame on the spring. This drum carries a radial partition. Within the compartment is a rocking piston connected through a crank to the car axle. In this piston means are provided for by-passing a portion of the glycerine from one side of the piston to the other. There is a check valve in the partition for passing glycerine in one direction and in the body of the cylinder and in communication with the by-pass channel is another check valve held closed by a

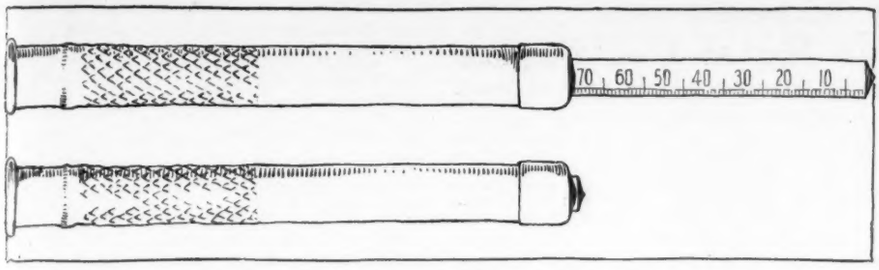


FIG. 5—TWITCHELL TIRE GAUGE

spring and which opens or closes the gateway leading from one side of the partition to the other. The restricted flow of the glycerine through these check valves when compressed by the piston constitutes the absorbing feature. The piston is rocked by the separating or coming together of the axle and frame.

TWITCHELL AIR GAUGE

The W. D. Newerf Rubber Co., Los Angeles, Cal., is manufacturing the Twitchell air-gauge, invented by C. R. Twitchell of the same city. This gauge is to ascertain the air pressure in a tire, and in using it all that is necessary to do is to unscrew the valve cup and screw the gauge in place. This permits the air pressure within the tire to operate, the pressure being shown by forcing a graduated ribbon through the end of the gauge casing. The entire device is 3½ inches long and can be carried in the vest pocket.

WOOD SPARK INTENSIFIER

To double the strength of a spark produced by a simple battery or magneto and to prevent fouling of spark plugs is the purpose of a device invented by Garfield A. Wood, of the St. Paul branch of the Northwestern Auto Co. The device weighs an ounce and fits easily into the vest pocket. The name given it is a spark intensifier. The intensifier is a brass cup 2¼ inches in diameter and ¼ inch high. In it are placed two sets of fine wire coils separated by a dielectric and imbedded in a patent composition. The coils are bridged across the terminals of the secondary circuit, one side being connected to the top of the spark plug and the other attached to the base. While the ordinary spark from a simple battery or magneto is of a bluish tinge the spark that has passed through the Wood intensifier is incandescent and more than doubled in strength, it is claimed. Tested in connection with a magneto the intensifier appears to be as efficient as when used with a battery or set of dry cells.

YORK CLOCK A NEW PRODUCT

The Motor Car Equipment Co. offers a new product in the York clock, which is of the 8-day type and is contained in a polished brass case with porcelain dial 2½ inches in diameter. This concern also markets the Savoy clock of the 8-day type, and which has been improved by a new movement, designed to resist constant jar and shaking. The fastening arrangement is such that it is impossible to detach the clock without the key.

SWINEHART TWIN TREAD BRIDGE

A new type of solid rubber tires has been placed on the market by the Swinehart Clincher Tire and Rubber Co., Akron, O. It is designated the twin-tread bridge tire. The bridge construction consists of a series of cylindrical rubber parts of the tire, between which are open spaces. This construction is intended to prevent cutting or tearing away of the tire proper as well as to increase the resiliency of the tire. It is claimed that these bridges take up shocks gradually, offering slight resistance at the beginning but spreading and breaking shocks as the cylinders are flattened out.

WILES TIRE SLEEVE

A comparatively recent invention is that of the Wiles tire sleeve, manufactured by the Diamond Rubber Co. Its features are that it can be quickly applied, and is equally as good for rim cut, blow-out, or tread puncture. It is constructed of rubber and sea island fabric, with metal clamps riveted to the sides, which hook into the rim of the wheel and hold the sleeve in place. Various sizes are supplied to fit the different sized tires, and a fabric blow-out patch is furnished with each sleeve.

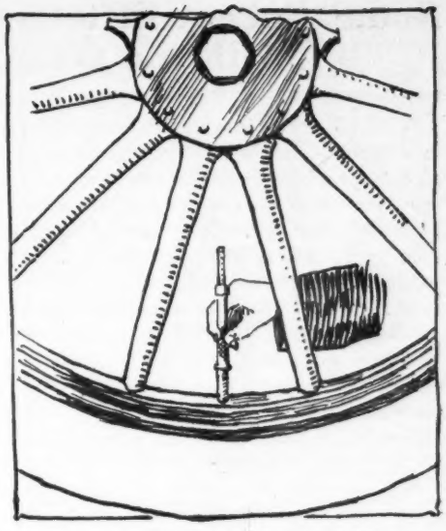


FIG. 6—USING TWITCHELL GAUGE

UNIVERSAL TIRE REMOVER

The Universal Auto-Tire Remover is the product of a San Francisco concern, which claims it will remove any tire from any rim without the use of a hammer or marring the paint of the wheel. Its principle is that of the compound lever. It is an adjustable combination tool about 20 inches long and weighing 4 pounds.

FOR THE STEERING WHEEL

The Eze-Grip, manufactured by the Haynes-Surridge Dry Goods Commission Co., St. Louis, is a patent removable cover which laces tightly around the steering wheel. It is designed for the protection of the hands while steering the car; to prevent chafing of the hands, and protect them from the cold surface in winter; to prevent slipping from perspiration in hot weather, and afford the driver a better grip on the steering wheel. It is made of soft pliable leather, in both black and tan, lined with wool felt, or can be furnished to suit the taste.

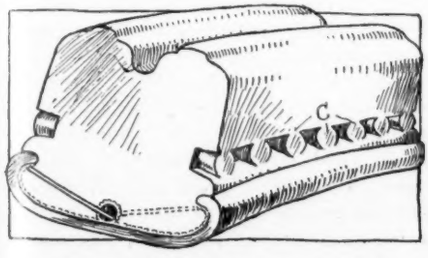


FIG. 7—SWINEHART BRIDGE TIRE

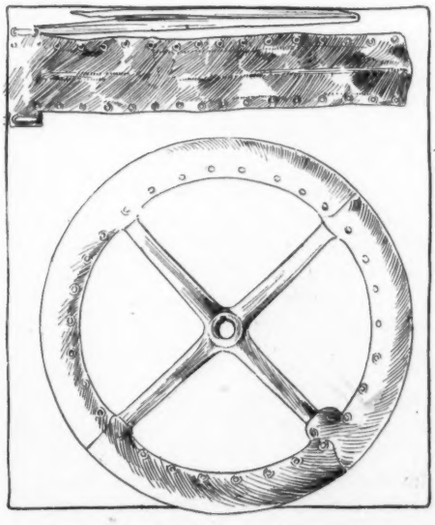


FIG. 8—STEERING WHEEL PROTECTOR

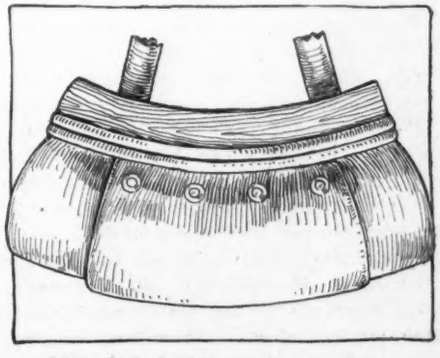


FIG. 9—WILES TIRE SLEEVE

Some Recent Efficiency Experiments With the Gasoline Motor Car Engine

EDITOR'S NOTE—Abstract of a paper entitled "The Effect of Size and Speed upon the Performance of an Internal Combustion Engine," by Bertram Hopkinson, M.A., M.I.C.E., read before the Incorporated Institution of Automobile Engineers of Great Britain on February 10, 1909.—Part II.

OWING to the many disturbing factors which come in when the speed is varied, comparisons of efficiency at different speeds are difficult, and the data are as yet insufficient to enable the law of variation to be stated with any precision. It is, however, quite certain that efficiency increases with speed to a notable extent so long as there is time for reasonably complete combustion. Mr. Morse made a careful study of this question on the Daimler engine, and the following table shows the results which he obtained:

TABLE IV

Speed r. p. m.	Efficiency	Exhaust-gas analysis CO_2	O_2	CO	H_2
720	0.245	13.5	0.2	0.7	0
1,000	0.26	...	Not taken		
1,220	0.275	14.0	0	0	..

In each test the strength of mixture was such as to give maximum efficiency, which in this engine corresponded to the maximum strength of mixture consistent with complete combustion. If weaker mixtures were used there was a good deal of unburnt gas in the exhaust. Similar tests on the Siddeley engine are in progress, and, although not yet complete, point unmistakably in the same direction. Compare the following test at 530 revolutions with those at 930 revolutions, the results of which are given above:

TABLE V

			A	B
Speed, revs. per min..	530	535	930	930
B. H. P.	18.0	17.0	28.9	29.7
Friction	1.6	1.6	4.5	4.5
Pumping	0.6	0.6	1.0	1.0
I. H. P.	20.2	19.2	34.4	35.2
Gasoline per min, lb..	0.219	0.202	0.308	0.310
Analysis—				
CO_2	13.5	13.4	13.5	13.1
O_2	0.5	1.8	1.4	1.3
CO	0.8	0.0	0.0	0.3
CO_2 after exploding residue	0.5	0.35	..	0.7
Efficiency on gasoline consumption	0.207	0.213	0.252	0.256

It is possible that by better adjustments the efficiency of 530 revolutions may be slightly improved; but the author considers that 7 per cent is the outside of what is possible in this direction. There is no question that the efficiency at 530 revolutions is at least 10 per cent less than at 930 revolutions.

Exhaust Gas Analysis

From the point of view of the motor car engineer, the power of an engine is of greater importance than its efficiency. Given the efficiency, which depends almost wholly on compression ratio and strength of mixture, the maximum power is determined by the quantity of oxygen which the engine can burn per minute. The maximum amount of explosive mixture which an engine sucking from the atmosphere can take in per stroke is equal—apart from scavenging devices having the effect of replacing the contents of the clearance by explosive mixture—to the stroke volume reckoned at external temperature and pressure. The ideal engine, from the motor car engineer's point of view, would be one which took in the whole of this volume at each stroke. In actual practice this ideal cannot, of course, be attained, because, on account of the throttling action of the valves and the heat-flow from the walls of the cylinder during suction, the mixture as it is drawn in is warmed a little above the external temperature. Moreover, the pressure at the end of the suction stroke may be rather below that of the atmosphere.

An estimate of the total quantity of air taken per revolution can be formed from the exhaust gas analysis. Taking the average of the two tests at 930 revolutions, the results of which are given above, it appears that 0.31 pound of gasoline is taken per minute, and that there is 1.35 per cent of free oxygen in the exhaust, equivalent to about 6 per cent of the total oxygen taken by the engine. As against this unused oxygen, however, is to be set the unburnt carbon and hydrogen in the exhaust, the combustion of which would require at least two-thirds of it. The remaining third is equivalent to about 2 per cent of the whole oxygen supply. At this speed, therefore, the air taken in per minute exceeds by something less than 2 per cent that required to burn completely 0.31 pound of gasoline. It may be taken without serious error as that equivalent to 0.315 pound. Since 1 pound of gasoline requires 187 cubic feet of air for its combustion, the quantity of air taken per cylinder per suction is approximately .0315 cubic foot reckoned at 0° C. and normal atmospheric pressure, or .0335 cubic foot at the external temperature of 15° C. This is mixed with about 2 per cent of its volume of gasoline vapor. The stroke volume is .0495 cubic foot, so that the engine takes in very nearly 69 per cent of the maximum possible amount of mixture.

Power of Importance

In the case of the Crossley engine, the total quantity of gas and air taken under various conditions was measured by anemometer and gas-holder, and was found to vary from about 82½ to 87 per cent, according to the temperature of the engine. With a hot engine, as in the above tests on the Siddeley, the proportion would be about 83 per cent. In both engines the pressure at the end of the suction stroke is very nearly that of the atmosphere; and the loss of volume is mainly due to the warming of the air as it is drawn in by the work of suction and by the abstraction of heat from the cylinder walls. In the Siddeley, however, there is a slight loss due to the fact that the pressure does not fall to the atmosphere until about 7 per cent of the suction stroke has been completed. The effective suction stroke is about 5 per cent less than the engine stroke. Allowing for this, it appears that the heat absorbed by the charge and the work done on it during suction are sufficient to warm it through, about 100° C. against about 60° C. in the Crossley. The work of suction is nearly the same in the two engines. The greater heat absorption in the Siddeley is perhaps due to the close proximity of the exhaust and inlet-valves; a large part of the incoming stream of gas must pass over the exhaust-valve, which will have a temperature of perhaps 300° or 400° C. Whatever the cause, however, it would appear that the reduction of this heat absorption during suction is a matter worthy of the consideration of designers. If the Siddeley and Crossley engines could be brought on to the same level in this respect the power of the former would be increased by about 15 per cent. The Daimler engine, when running at a speed of 750 revolutions per minute, was found to burn 0.197 pound of gasoline per 1,000 revolutions, the exhaust gases containing about 0.2 per cent excess of O and 0.7 per cent of CO. Probably 0.19 pound per 1,000 revolutions would represent its consumption at this speed if the combustion were perfect. The corresponding supply of air is .0188 cubic foot per suction, reckoned at 15° C., making, together with the gasoline vapor, 65 per cent of the stroke volume. At a speed of 920 revolutions per minute—when the piston speed is the same as that of the Siddeley—the ratio would not be more than 55 per cent. In this respect, therefore, the more modern Siddeley engine shows a material improvement. This is doubtless due in part to its larger size, but the valve action is also probably better. The rise of pressure at the end of the exhaust stroke, due to the exhaust of a neighboring cylinder, was more marked in the Daimler than in the Siddeley, and it is possible that some of the exhaust gases packed through from the exhaust to the inlet pipe during the overlap of the inlet and exhaust valves. In the Siddeley engine this overlap is reduced to a very small amount, and it is not possible that much gas can get through. Moreover, the Daimler engine did not "fill up" quite so well as the Siddeley at the end of the suction stroke. It is worthy of remark that the inlet-valve of the Siddeley engine remains open until 45° after the in-center. The author is informed that this is an exceptionally long period for a gasoline engine. The pressure was perceptibly short of the atmospheric pressure at a speed of 1,000 revolutions per minute; whereas in the Siddeley the difference is difficult to detect on an indicator diagram.

The quantity of air taken per suction in both of the car-engines falls off con-

siderably with the speed. The following tests illustrate this point:

TABLE VI—SIDDELEY ENGINE

	A_1	A_2	B
Speed	530	535	930
Gasoline per 1,000 revs., lbs.	.42	.375	.333
Exhaust analysis—			
CO_2	13.55	13.4	13.1
O_2	0.55	1.8	1.3
CO	0.8	0.0	0.3
CO_2 from explosion of residue	0.5	0.35	0.7
Air taken per suction per cylinder (Cub. ft. at 15°C.)	.041	.0395	.0335

Test of Efficiency

The test B is one of those already quoted in connection with efficiency. It appears that the air taken in per suction is about 20 per cent greater at 530 revolutions than at 930 revolutions. The ratio of air and gasoline vapor taken—reckoned at 15° C.—to stroke volume is 83 per cent at the former speed against 69 per cent at the latter. This difference is to be ascribed in part to better "filling up" at the end of the suction-stroke. This, however, cannot account for more than one-third of the difference, and the more important cause probably is that the temperature of the valves and walls is lower and the charge takes in less heat as it is being drawn in.

It may be remarked that it was found necessary to admit a large quantity of "extra air" in order to burn the gasoline at 530 revolutions per minute. A special hole had to be cut for this purpose in the inlet-pipe. According to the manufacturers' tests, which were made without this additional air supply, the gasoline consumption at 530 revolutions is .485 pound per 1,000 revolutions, and of this about one-eighth part must have passed through the engine unburnt. This test was made with the ordinary setting of the carbureter, which was kept the same at all speeds, as is necessary in practical working.

Mr. Morse's tests on the Daimler engine showed an even greater variation in the volume of charge taken, with speed:

TABLE VII—DAIMLER ENGINE

Speed r. p. m.	Gasoline taken per 1,000 revs.	Ratio of air and vapor to stroke volume	Vacuum in inlet pipe lb. per sq. in.
720	0.197	0.65	0.6
1,000	0.16	0.53	..
1,220	0.138	0.455	..

Analyses were taken at 720 and 1,220 revolutions per minute. Particulars of these are given above, and they show that the combustion was nearly complete, and that there was no excess oxygen. At 1,000 revolutions no analysis was taken, but the gasoline consumption was that corresponding to maximum efficiency, and it is certain that combustion was practically complete.

Exhausting the Engine

The charge volume is, of course, greatly influenced by the length of the exhaust-pipes. In the tests on the Siddeley and Daimler engines which have been described, the engine exhausted through a short pipe into a box. The effect of gaseous inertia is then comparatively slight at all speeds; at 930 revolutions per minute the pressure drops to atmosphere at about the middle of the exhaust-stroke, and then rises again. If the exhaust-pipe were considerably longer, the pressure drop would be delayed, and its amount increased, and the result might be to cause a partial vacuum in the clearance space. Since the clearance volume is one-third of the stroke volume, it is obvious that a great improvement in power can be effected by filling it with mixture. The Wolseley Co. informed the author that it has tried experiments of this character, and that by making use both of long inlet-pipes and long separate exhaust-pipes they have increased the power of an engine by as much as 50 per cent at high speeds. In this the gasoline consumption was increased in a greater ratio, and a good deal of the fuel doubtless passed through the engine unburnt.

Early Tests of Daimler

The author believes that some early tests of his own on the Daimler engine, in which considerably higher mean pressures were realized than those obtained by Mr. Morse, are to be explained by a difference in the exhaust conditions. Mr. Morse, with a short exhaust-pipe opening into a box, could only obtain 15 brake horsepower at a speed of 1,000 revolutions per minute, the gasoline consumption being 0.16 pound per minute, whereas in the earlier tests over 17 horsepower was recorded with a gasoline consumption of 0.22, some of which was probably unburnt.

In its influence upon practical design and operation, the fact that from 30 to 50 per cent of the heat developed in the explosion ultimately passes into the cylinder walls, is probably the most important and distinctive feature of the gas-engine. The heat so supplied to the metal has to be removed from the outer surface as fast as it is generated within, and thus arises the necessity for the costly and heavy waterjacket, with its attendant appliances for circulating and cooling the water. Moreover, the temperature gradients which must exist in the metal in order that the heat may be conducted from the places where it is generated to the places where it is removed, give rise to great differences of temperature between different parts of the metal structure and to high local temperatures at places—such as the center of the piston or exhaust-valve—which are at a distance from the waterjacket. These differences of temperature cause unequal expansion and corresponding stresses; and the high local temperatures may give trouble from pre-ignition. These effects of heat flow are of far more importance practically than its effect upon efficiency, which is comparatively slight. This is more espeically true of large engines in which the stresses due to unequal expansion constitute a serious problem for the designer, and are responsible for many failures. But the subject is not without its importance in the construction of small motors. The expansion stresses are not, as a rule, serious in such cases, but difficulties often arise from pre-ignition.

The factors determining the temperature of the metal at any point on the inner surface are the mean rate of heat flow per unit area into the wall near that point, and the distance which the heat has to travel before reaching the jacket water. The first of these factors is dependent mainly upon the gas—its density, temperature, and state of motion—and is but little affected by the temperature of the solid surface within the limits which are possible in practice. It is obvious that gas having a temperature of 1,500° C. will lose heat at nearly the same rate to a metal surface, whether that surface be at 100° or 300° C. The second factor is mainly dependent upon the design and size of the engine, and on the conductivity for heat of the metal.

A rough approximation to the rate of heat flow per unit of area can be obtained by dividing the mean area exposed to the hot gases into the total heat carried away by jacket water and radiation. An estimate of this kind can, of course, only give the order of magnitude of the absolute value of the heat flow at any point, for the distribution of the jacket loss over the different parts of the cylinder wall is not uniform, and is very imperfectly known. But it will serve as a fair basis of comparison between different engines, provided that the "mean area" used in the calculation is taken out in the same way for all.

The surface exposed in each engine at different points in the stroke, together with numbers representing the ratio of volume to surface, are shown in the following:

TABLE VIII

	Crossley	Siddeley	Ratio
In-center surface, sq. in..	400	82	4.9
Out-center surface, sq. in.	1,160	156	7.4
Mean surface, sq. in....	780	119	5.5
D_2	132	21	6.3
Mean surface—			
Total cylinder volume...	0.30	1.06	0.28
.....	.087	0.22	0.4

In the Siddeley engine working fully loaded at 930 revolutions, about 2,300 thermal units per minute are carried away by the jacket water and by radiation, equivalent to 40.5 per cent of the total heat supply. The loss per cylinder is 575 thermal units per minute. In the Crossley, working at 180 revolutions, with a mixture of corresponding strength—viz., 11.2 per cent of coal gas—the total loss by jacket and radiation is 2,250 thermal units per minute, or 34 per cent of the total heat supply. Taking these figures and dividing by the surfaces, we get the following values—Table IX—for heat flow per square inch, according as the surface is taken to be that exposed at the in-center, the out-center, or the mean of these:

TABLE IX

	Crossley	Siddeley	Ratio
In-center	5.6	7.0	1.25
Out-center	1.95	3.7	1.9
Mean	2.9	4.85	1.7

ANALYZING MOTOR CARS' STEERING SYSTEM

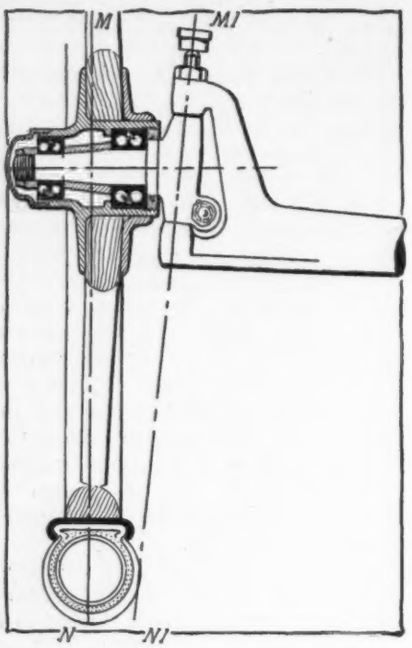


FIG. 1

EDITOR'S NOTE—This is part 4 of a series of articles by Thomas J. Fay, dealing with the problem of the steering system in motor cars

SHOCK to the steering crank, on the knuckle of the front road wheel will be more or less, depending upon the design, an intimation of which was given in the closing paragraph of the last published part of this article, and Fig. 1 is here given to more clearly indicate the manner in which such shocks can be minimized. The section, Fig 1, is of a design in which it is shown that the center line of the wheel, MN, and the center line of the knuckle MINI do not intersect at the point of contact of the tire with the road, and the result is that a crank moment will generate, the magnitude of which will be proportional to the difference as shown at N and NI.

The magnitude of the crank-arm moment due to the difference N and NI, while it will be in proportion to the difference, as before stated, will also be capable of influencing the car performance in a manner depending upon the diameter of the front road wheels, as they relate to the height of road obstructions to be negotiated in the regular course of events. In the absence of road inequalities of a magnitude sufficient to influence the situation, it is a matter of no moment as to whether the conditions, as they are depicted in Fig. 1, obtain or not.

It is when the steering road wheels intercept an obstruction of a relative great height that the difference noted in Fig. 1 becomes a menace. On the other hand, it is not convenient to reduce the distanc NNI to zero, and it is therefore desirable to use road wheels of a good diameter, and reduce the distance NNI to the minimum besides.

In this type of steering gear it is usually the practice to use multiple-thread worms, a good example of which is shown in Fig. 2. The quadruple thread depicted affords good proportions of the teeth, the angle is as close to the irreversible as it is desirable to go, the surface of actual contact is quite enough for good work from the point of view of long life, and this particular gear has seen some 9 years' service to its credit in cars that have made and maintained a reputation for minimum upkeep, and good road performance.

In some cases the sector S is left out and instead the whole worm-wheel W is used, in the manner as shown in Fig. 5, which figure also depicts the section of the steering column, and the way in which the details are worked out. This is illustrative of general practice, in which concentric tubes are used thus: The outer tube is of thin brass, does not rotate and serves as a spacer, as well as holding the bearings in rigid relation. The second tube is in rigid relation to the worm and the steering wheel, so that, if the wheel is rotated so will the worm rotate, which in turn causes the sector to respond, hence the steering crank, which is also in rigid relation. The third tube serves for the spark, and is rotated besides connecting with a lever on the top of the steering column, above the steering wheel, for the convenience of the driver. The inner member in the concentric nest can be a rod, although it may also be a light tube of small diameter, and if the member is connected with the spark, it is then that the inner rod will be for the purpose of controlling the throttle.

The Worm and Sector

Presupposing a worm and sector for the purpose, it follows that certain of the considerations must be settled upon before it will be possible to intelligently use any formulæ in arriving at the respective dimensions of either the worm or the sector. The arc of the sector will depend upon the canting angle of the front road wheels, and this cant depends upon the afforded room, taking into account the

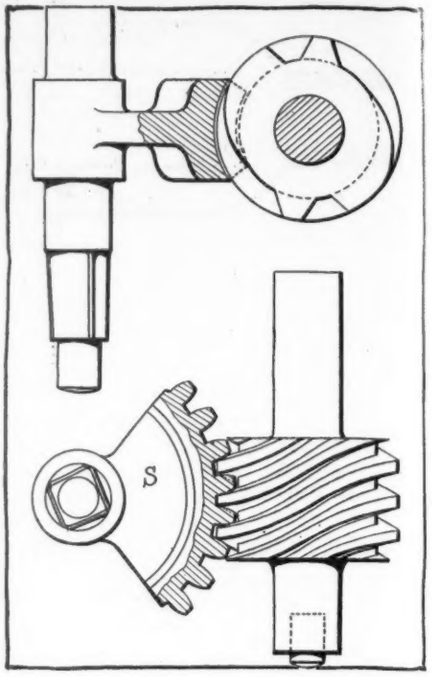


FIG. 2

diameter of the road wheels, and the section of the tires to be used, as well as the distance from the wheel to the side of the chassis frame.

It will also be necessary to consider the relation of the steering wheel to the canting angle, in order to determine th number of revolutions of the steering wheel for a given, combined, canting angle. If the steering wheel is to make one and one-half revolutions while the road wheels cant the full sweep from right to left, this information must be in hand before it will be possible to apply any formula in the process of designing the worm and sector.

After considering the details of the service, and having decided on the relation of the steering wheel to the road wheels, it is possible to use the formulæ of the worm and worm gear, one version of which is as follows:

$$8 \ldots . D = \frac{y\,P}{\pi} = 0.3183\ y\,P\ ;$$

$$9 \ldots . B = D + 0.6366\ P\ ;$$

$$10 \ldots . C = B + \frac{2\,(N - N \cos A)}{D + D'}\ ;$$

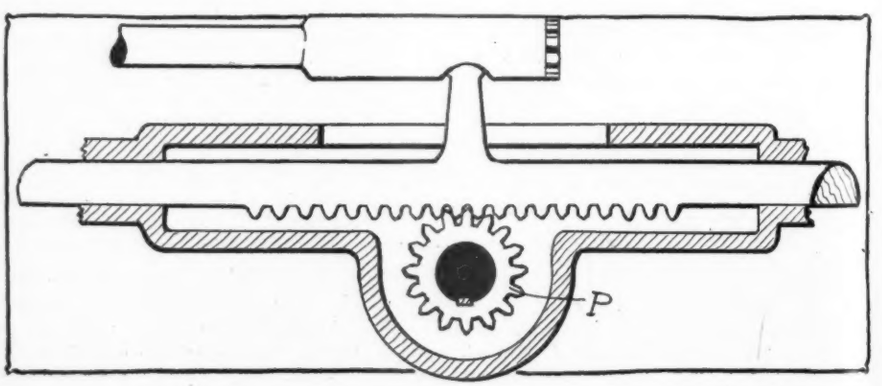


FIG. 3

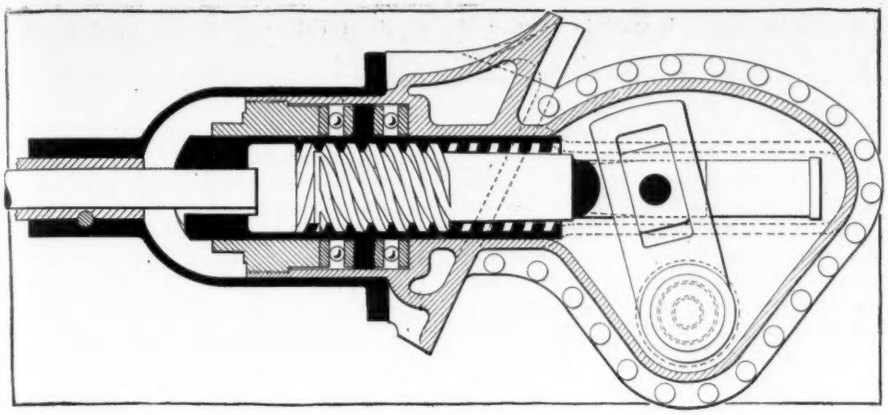


FIG. 4

11....$F = \frac{}{2}$;

12....$D' = 2F - D$;

13....$M = \frac{D'}{2} + 0.368\ P$;

14....$N = \frac{D'}{2} = 0.3183\ P$;

15....$E = D' + 0.6366\ P$;

16....$B' = D' - 0.736\ P$;

17....Tang. $S = \frac{L}{\pi D}$;

18....$L = P\ Z$;

19....$P = \frac{L}{Z}$;

20....$Z = \frac{L}{P}$;

When:
y = number of teeth in the worm wheel;
P = circular pitch;
S = lead angle in degrees;
Tooth angle = 29 degrees.

Discussion of Formula

The formula of the worm and sector will best be understood if reference is had to the diagrammatic illustration, Fig. 6, in which will be found the reference letters corresponding to the letters used in the formula. In relation to the material to use, it will be understood that there are several choices, as for illustration, the worm can be of cementing steel and case-hardened. The sector can be of phosphor bronze. Alloy steel may be used for the worm, and the choice of cementing or quenching from some high temperature will fall to the lot of the chooser.

The cementing process has its advantages, and assures a hard surface, which is well worth taking into account. If alloy steel is used and the same is to be cemented, it is then that the carbon content should be low—very low indeed—and this is the kind of steel that is hard to get. Whether or not the material of the worm is to be of alloy or carbon steel, if it is to be subjected to the cementing process, the carbon should not be higher than 20 point, as an outside figure. For the rest it is largely a matter of personal choice, among the respective generic types of steel.

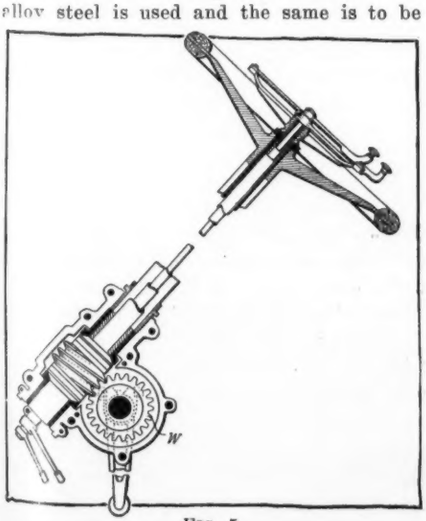


FIG. 5

Considering the cementing process, and allowing that the core of the cemented section should be tough and soft, the steels as follows might be selected:

The chemical composition should be within the following and the steel for worms should be of the acid process:

Carbon	.15-.20
Silicon	.10-.20
Sulphur	.03-.04
Phosphorus	.03-.04
Manganese	.30-.40

The physical properties should be those due to proper fabrication of the steel, but it is hardly worth while to go over this phase of the question, for the reason that the steel will be so altered in the cementing process that it is a well-fabricated product, the end will be that due to cementing, which is bound to represent a decided improvement.

Cementing Nickel Steel

In nickel grade of steel there is so much chance of going wrong that it is a question if it is worth while taking the chances, unless access can be had to some well-known grade of steel in which the imperfections that do abound in nickel steel will be more nearly absent.

At all events the steel should be an acid product with the carbon positively within the limits here given:

Nickel	4-5
Carbon	.10-.15
Silicon	.15-.20
Sulphur	.03-.04
Phosphorus	.03-.04
Manganese	.30-.40

The elongation should not be less than that as here given, with the steel in the normal state:

Elastic limit in pounds per square inch, minimum	60,000
Tensile strength in pounds per square inch, maximum	90,000
Elongation, per cent in 2 inches, minimum	30
Reduction of area in per cent, minimum	69

In this work the test proof should be 0.5 inches in diameter, and it would be of advantage to experiment with some of the steel, before and after cementing, with a view to ascertaining the extent to which it will become brittle in the heat-treatment. Some grades of nickel steel behave better than others in this service, and in not a few cases it was found that the steel could not be safely used at all. It is in repair work especially that care should be exercised, since in the maker's plant much experience generally eliminates the troubles likely to arise.

In chrome nickel steel there is ample opportunity to get into trouble, due to high carbon, and such other irregularities as can readily fall to dual alloy steel. The remedy lies in not using the steel at all, unless the carbon is low, and provided the physical properties are quite up to the standard here set.

With the understanding that the carbon will be lower, if anything:

Chromium	1.40-1.60
Nickel	4.40-4.60
Carbon	.10-.15
Silicon	.15-.20
Sulphur	.613-.015
Phosphorus	.01-.013
Manganese	.30-.40

Under no circumstances should the elongation be less than the value as here given, for the steel in the normal state:

Elastic limit in pounds per square inch, minimum	90,000
Tensile strength in pounds per square inch, maximum	110,000
Elongation, per cent in 2 inches, minimum	22
Reduction of area, per cent, minimum	65

Penetration of Steels

In the cementing process the penetration will not be exactly the same for the several grades of steel, but the chart—Fig. 4, Part III—will afford such information, in relation to the time, that nothing more will need be put down here, especially as this phase of the subject can be taken up by the interested reader, as a separate matter.

After cementation it is necessary to quench, and in the process there is every chance to go wrong. With some grades of steel the single quench will do, and the case will be hard, while the core will be soft and tough. In some examples the core will be rendered crystalline in the process

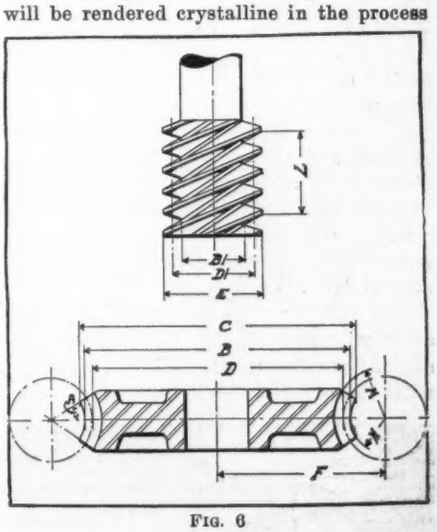


FIG. 6

that makes the shell hard, and the result will not be good. To eliminate this trouble it is necessary to put the parts through a double quenching process in the manner as follows: Quench at 900 degrees centigrade, in oil at the temperature of the surrounding. Reheat to 750 degrees centigrade, and then quench in salt water at the temperature of the surrounding.

In this way the core will be rendered tough and soft, while the shell will be quite up to the hardness likely to result from the use of the given grade of steel. As regards the efficiency of quenching baths, the media are given below in the order of merit:

The first-named quenching medium—mercury—cannot be used with safety, excepting for very small parts, on account of the poisonous vapors emitted, and for that matter all heat-treatment work is attended by more or less risk.

Mercury.
Acidulated water, ice cold.
Salt water, ice cold.
Salt water, at surrounding temperature.
Water, at surrounding temperature.
Water, with skim-milk.
Limewater.
Fish-oil or cottonseed oil.
Cod-liver oil.

If some means are at hand for maintaining a constant temperature of the quenching bath, and if the parts are placed in a jet of the liquid, to wipe off the globules of steam, the efficiency will be much enhanced.

Since lost motion is the bane of the steering gear situation, it is not believed that too much time has been taken in the act of indicating the manner in which the worm can be rendered as serviceable as possible, and the process of repair is certainly one that is well worth more than a little of the most careful attention. When the worm is so worn that flat spots are noticeable on the faces of the threads, it is generally better to cast the worm out and make a new one for the purpose.

The rack-and-pinion form of steering gear is used to some extent in commercial car work and in many respects it is to be commended. True, lost motion must be present to the extent that back-lash is a necessary property in the relations of the rack to the pinion. It is also true that the lever advantage will be less than that due to the use of the worm and sector, and irreversibility is entirely absent in this type. Fig. 3 depicts a conventional form of rack and pinion gear, which, with a pinion P of the smallest possible number of teeth considering good practice, and a steering wheel of the greatest possible diameter, it becomes feasible to use the idea to fair advantage.

Although the worm-and-sector plan does away with any need of sliding bearings, such as are frequently used in connection with the screw-and-nut type of steering gear, the latter plan is much in vogue, and it has the advantage of large bearing surface for the threads of the reducing members, and the sliding bearings, when they are used, are made with adequate surface for the purpose. Fig. 4 is a good illustration of one phase of the scheme, and although details of the respective plans are not always along parallel lines, even so, to the owner, and the repairmen, the deviation should not prove of undoing purport, and because the surfaces are a maximum, coupled with good facilities for lubricating, the evil day should be much deferred and repairs should not be past the ingenuity of a man of fair skill, while the tools in the average shop should be adequate for the purpose.

In conclusion, it will be the aim to advocate the presence of good materials in the component parts of steering gear, and such fine workmanship that the chances of trouble will be as a remote contigency, and even then under stress of the greatest provocation. A good steering system has the cranks, linkages and the drag, as well as the tierod, nested high up and back, out of harm's way.

Foreign Trade Tips From Uncle Sam

Consul E. Haldeman Dennison, of Bombay, makes the following suggestions relative to the introduction of American motor cars in India: "The American motor car is little known in India and still has to prove itself the equal of the continental makes used in India. There are now 1,000 motor cars registered in Bombay, and not one of these is of American make, with the exception of a few cripples, the remains of a lot of cheap runabout which were dumped on this market some years ago and which proved so unsatisfactory that the trade in machines from the United States was killed. This market is well worth the best efforts of American manufacturers and exporters. Among the well-to-do natives the motor car has become popular, and the continental manufacturers have been reaping a rich harvest from the ever-expanding trade. The native as a rule is unfamiliar with machinery and desires a car that is going to give him the least trouble possible. He is quite willing to pay a good price for a superior machine, and American exporters would do well, when they really determine to exploit this market, to introduce only their best machines. There is only one road in India that approaches the standard of those in Europe, and that is the trunk line between Bombay and Calcutta. This would seem to give the American car some advantage, as it is built to negotiate even the roughest sort of roads. Until American manufacturers are ready to expend considerable time and money in developing their trade they might as well not attempt to enter this market, as the writing of letters and sending of catalogues is a waste of time."

In stating that there are nearly 150 motor cars in Rangoon and probably fifty more at other places in Burma, Consul E. A. Wakefield gives the following trade particulars: "These cars are, with a few exceptions, made in England, selling at prices varying from $500 to $4,000. One French car cost $6,000. A few years ago an American one-cylinder car was sold in India, which gave very poor satisfaction. Today there are no American cars sold in the province of Burma and to successfully reintroduce them it would undoubtedly be necessary to practically demonstrate their serviceability and durability in a most thorough manner. It is very questionable if American manufacturers could sell a car here without having the machine on the spot to be thoroughly tested. One car in successful operation would be worth more here than all the correspondence and advertising matter they could send. The roads in and near Rangoon are excellent for motoring, so that the number of cars in use is steadily increasing. This is true of Mandalay, Moulmein, and Bassein to a more limited extent. If an American manufacturer could secure a Rangoon firm of unquestioned reliability to act as his Burma agent it should be easy to secure a foothold which would lead to a continually increasing business."

Consul Roger S. Greene, of Dalny, believes that a motor car business may be worked up in that part of Manchuria. He says: "This city and district are still comparatively new and there are few persons here who could afford to keep even a medium-priced motor car. There is, however, ample interest in everything new, and it might be possible to sell a small number of cheap cars, provided they are strongly built. As there is not a single motor car in the city, business is all in the future and must be worked up. Most of the roads in the city are now in good condition, having been newly macadamized. Outside the city limits the roads are not suitable for motoring. The principal machinery dealers here are railway and government supply contractors, there being as yet little outside business in machinery. These firms have head offices in Japan and branch houses in New York, through whom business relations in this locality might be advantageously formed. Commercial relations once established with these firms would be useful in other lines and in other localities, as their business extends over a wide field in Japan, Korea and China and other adjacent sections.

The Motor Car Repair Shop

Fitting Piston Rings Properly

LIKE all other mechanical operations, the fitting of piston rings is comparatively simple—if you know how; but many are sprung and some are broken. Most manufacturers now cut the grooves in the piston, and grind the face and edges of the rings to a gauge, making very little hand-fitting necessary. But there are cases, and these are the ones that generally come into the repair shop, where the cut was just a trifle larger, or the ring a little smaller than the gauge, making it essential that each ring be individually fitted to the groove in which it shall subsequently rest.

To properly dress down a ring requires some skill, and a good mechanic will select a ring which will demand the least amount of trimming, for it is a delicate operation. After having selected a set of rings the first operation is to fit them into the cylinder. Taking one of the rings, try very carefully to shove it straight in, concentric with the cylinder walls; if the ring is of the diagonal slot type and its diameter is a little large, the ends will run up on each other, throwing the edges out of line; while if a ring with square-cut overlapping ends is used, it will not go in at all. Therefore, the ends must be trimmed off so that when the ring is well up into the cylinder there will be a space of about 8 to 15 thousandths of an inch between the ends, to allow for expansion caused by the heat of the motor. The groove on the block shown in Fig. 1 is used in reducing the size of the diameter of diagonally-slotted rings.

A thin, smooth, flat file is best used for this purpose and it should be placed between the ends of the ring with its bottom edge in the groove G. The ring must then be pressed together so that its ends bear against the surfaces of the file as it is moved forward. The ring should be repeatedly tried in the cylinder in order that the space is not filed to exceed the above dimensions. The inside portions of the rings near the ends should rest against the nails, in order that they may not be broken off when filing the slot. Having attained the proper space between the ends of the ring, now place a light in the cylinder behind it and see how its face conforms to the wall of the cylinder. If there is good contact all around, the ring is ready to be fitted to the piston; but if the contact is poor, either the ring or the cylinder is out of round. If the fault lies in the ring the face can probably be dressed down to fit, or another selected; but if the cylinder is badly out of round it will have to be rebored or reground, or both, as the case may be, or replaced with a new cylinder.

When the rings have been adapted to the cylinder, the next operation is to fit them in their respective grooves on the piston. Begin with the ring selected for the bottom groove, as that ring will be the first to be slipped on to the piston. First try the ring without slipping it over the piston by inserting it in the groove and rolling it around its circumference. It should fit snugly but still be free to slide in and out easily; if it binds in any place, apply a thin film of red or black lead or prussian blue in the same manner as used in scraping bearings, to locate the high places, then dress down with the thick, smooth, flat file and try again. When filing is necessary, it should be confined to one edge in order that at least one good edge is retained, for it is almost impossible to secure as regular a surface with a file as that made by a grinding machine.

A very simple and effective means of holding a ring is shown in Fig. 1; the ring is placed on a block of wood and a few small nails driven into the block both inside and outside of the ring in such a manner that the ring is held securely in place. The heads of the nails are then cut off, the ring removed, and the nails filed down so that they will extend just below the top surface of the ring when it is replaced on the block. With the nails well placed, there will be no danger whatever of breaking the ring when filing.

Having fitted one ring, put it in place immediately and repeat the operations with the next ring. A quick and safe method of slipping rings into their grooves is shown in Fig. 2. Take three strips of sheet metal, brass or tin, for instance, about 1-32 inch thick, ½ inch wide and 5 inches long; bend these at right angles and hang them on the edge of the piston at equal distances apart. The ring may then be slipped over these till it is opposite its groove, when the strips may be removed and the ring allowed to slide into place. The same strips may also be successfully used in removing rings.

It may be noted that the use of emery-cloth is not included in these operations. Emery-cloth should not be used in this work, and its use should be avoided. Cast iron, from which piston-rings are made, is very porous, and consequently will harbor many particles of emery, which will not be dislodged by simply wiping the ring apparently clean with a cloth, as is the custom in many shops. If emery is used the parts must be most thoroughly washed in gasoline before being assembled, or the emery which evaded the repairman's cloth will be drawn out by the oil when the motor is in service, and cause the owner to wonder why the cylinder grew larger and the piston small.

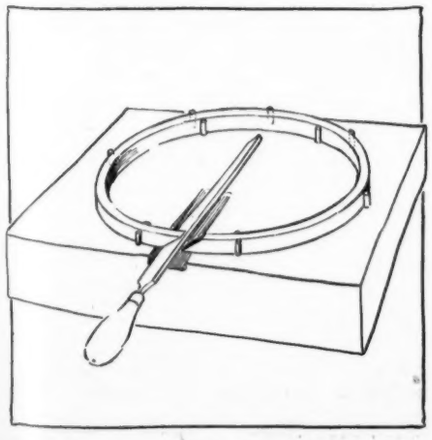


FIG. 1

Connecticut Road Plans

The board of selectmen of the numerous towns throughout the state of Connecticut have received instructions regarding the resumption of road work this spring, by the state highway commissioner, James H. MacDonald. The commissioner has informed the selectmen that the department is now ready to apportion the money placed at its disposal to the various towns that have been operating under the state aid plan. While it cannot be said just what action will be taken by the present legislature in the matter of roads immediate repairs on the state highways can be provided for with funds now at the disposal of the department. The apportionment of highway money will be carried out under the same arrangements as last year, in furnishing stone for macadam roads, gravel for gravel construction and turnpiking dirt roads. The price for turnpiking roads this season will be the same as last, that is, $20 per mile, of which, of course, the state pays three-fourths.

FIG. 2

The Realm of the Commercial Car

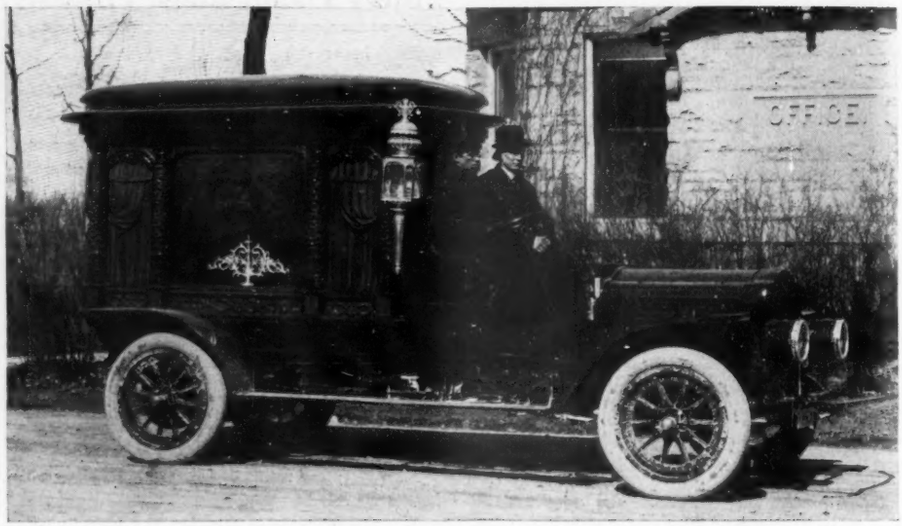
TALK TAXICAB RATES

REPRESENTATIVES of the different taxicab companies in Washington, D. C., were given a hearing last Friday before the board of district commissioners in regard to the execution of the recent act of congress authorizing the commissioners, after due investigation, to prescribe reasonable rates for taxicab service in this city and also authorizing them to fix proper penalties for the violation of the maximum charges. No action was taken, however, as the taxicab companies submitted a proposition as to rates which the commissioners will take under consideration.

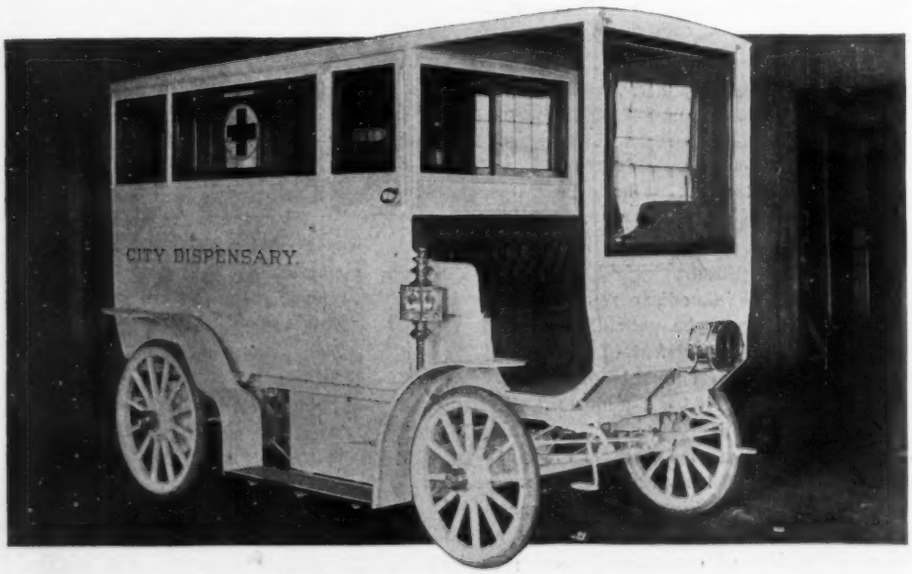
The new rates proposed by the taxicab companies are higher than the present charges. They are, in brief, as follows: Forty cents for carrying two persons, 60 cents for three or more persons, per mile. This is the same rate as charged at present. Standing rate, $1.80 per hour, an increase of 80 cents. For going and returning from the place where the taxicab is used to the central station, 20 cents per mile. There is no charge for this at present. Initial charge of 50 cents. The present initial charge is 30 cents.

The fact was brought out during the conference that up to the present time the operation of taxicabs in Washington has not been remunerative, the cost of keeping the cabs in repair having been greater than was at first anticipated. It was suggested that if the commissioners should establish rates which did not allow a reasonable profit upon the large amount of money invested in the business, the taxicab companies would seriously consider the proposition of taking the meters off the cabs and operating them as motor cars without using the present meters at all.

During the conference the question of alleged inaccuracy of the meters and overcharging on the part of drivers, was brought up. The managers of the two leading taxicab companies stated that in every case where an overcharge had been brought to their attention and for which the operator of the cab was responsible the discharge of the operator had immediately followed. It was claimed by both Manager Cline and Manager Fickling that these overcharges by dishonest drivers were a serious detriment to their business and that prompt correction of the abuse was a matter of self-protection. Frequent tests of the meters were made, it was claimed. It was announced that both companies would be satisfied to have the meter inspection made under police supervision. The commissioners will settle the question of rates within the next few days.



MOTOR HEARSE REGULARLY USED IN CHICAGO



WAVERLEY ELECTRIC AMBULANCE FOR INDIANAPOLIS

MOTORS FOR UNDERTAKERS

It has remained for F. F. Roberts, a Chicago undertaker, to install a motor hearse, an ambulance, two touring cars and a limousine as his rolling stock. Also he has contracted for another chassis which will be fitted with a white body for children's funerals. This departure was taken last week when Mr. Roberts conducted his first motor funeral, in which hearse and carriages were propelled by motor power. Since that time he has been kept busy with his motors and other undertakers are seeking to rent the rigs when Mr. Roberts is not using them. At the present time no set rates have been set because Mr. Roberts is the only one motor-equipped, but other undertakers are figuring with the White company for a similar equipment. The charge made for the motor hearse for the first funeral was $75 as against $50 for a horse-drawn one. As to seating capacity, $1.50 a seat is charged, it being possible to carry from six to eight in each car as against four in a horse-drawn equipage. It is claimed that Mr. Roberts' motor hearse is the first especially constructed for the purpose. It is a White steamer; the chassis was fitted with a special hearse body and built to conform with the best practices along such lines.

An interesting development of the motor funeral is the remarkable time-saving. The funeral took place outside the city limits and a distance of 11 miles over muddy roads and the city pavements was made in less than 1 hour, and the return trip was made in 40 minutes, thereby enabling those

attending the obsequies to be back to their homes or places of business, as the case might be, without taking nearly the entire day, as was the case with the horse-drawn vehicles. Owing to the fact that gasoline cars are not allowed in the cemeteries considerable anxiety was had regarding the permits allowing the funeral procession through the cemetery gates, but after taking the matter up with the managements of the city cemeteries it was learned that there would be no objection to the steam car, owing to the fact that after investigation the cemetery managers find that the White car is well suited for the purpose, owing to the absence of noise.

Attending the funeral were a large number of the municipal and city authorities, who were requested to attend in order to test the city ordinance relative to prohibiting the funeral processions on the city boulevards. As each vehicle in the procession was a motor car and heavily tired there was no objection raised, although the city authorities are investigating the proposition and may reconsider the present ordinance.

The hearse is a regular 30-horsepower chassis extended to fit the body. The change was made by the White company in its Chicago shops. The tires are Fisk demountables and the car carries a spare tire in case of puncture.

FOR MUNICIPAL USE

The city board of health of Indianapolis has purchased a Waverley electric ambulance for the use of the city dispensary, and it was placed in service March 30. It was built from a special design, which was made from suggestions offered by the board members and factory representatives. The ambulance is equipped with special high-speed, long-mileage batteries, so that a speed of about 20 miles an hour can be attained and 45 miles made on one charge. The ambulance is painted white with blue lettering, while the interior is of poplar in natural finish, with a hardwood floor. There are three entrances to the patients' apartment, one at each side, near the front, and one in the rear. The windows are placed high on each side and there are drab curtains. Four incandescents light the interior, while there is also an extension electric light for the use of the physicians in making examinations. An electric heater and two drawers for bandages, instruments and medicine are placed under the driver's seat. The car has solid rubber tires and the driver is protected by a top extending over the dash and a windshield.

RENAULT COMMERCIAL CAR USED IN NEW YORK

RIVAL OF A RAILROAD

The Standard Auto and Transit Co., of Ohio, is now perfecting plans for the operation of an hourly motor bus service between Myerstown and Womelsdorf, touching Millardsville and Stouchsburg. Although the Lebanon valley branch of the Reading parallels the pike between the termini, which are 7 miles apart, the service is so poor the promoters believe that the new line can be operated at a handsome profit. A sixteen-passenger bus will be put on at first, and the service will be extended if business warrants it.

RENAULT COMMERCIAL CAR

Although the Renault car has for a long time been a leader in the taxicab field, its use in a commercial or freight-carrying line has not been generally known. In addition to this, two types of light trucks and delivery wagons are built—one with a two-cylinder 4 by 4¾-inch motor rated at 10-14 horsepower, 118-inch wheelbase, 32 by 4-inch wheels, with a carrying capacity of 1,800 pounds; and the other with a four-cylinder 3¾ by 4¾-inch motor, rated at 14-20 horsepower and having 144-inch wheelbase, 66-inch tread, 34 by 4½-inch tires, and 3,400-pound carrying capacity. The use of twin pneumatic tires on the rear wheels of these trucks is a novelty in the commercial field. A fleet of six of these trucks has been ordered for service in conjunction with the delivery of the New York Herald, the order calling for three of each size.

TAXICABS FOR MILWAUKEE

Milwaukee will soon have its first taxicab, if reports concerning the organization of a company to carry on this service are to be considered reliable. It is said that Frank J. Edwards, manager of the Kissel Kar Co., the Milwaukee branch of the Kissel Motor Car Co., of Hartford, Wis., is having a Kissel taxicab built at the factory for use in Milwaukee. This will be a specially constructed machine and the first the Hartford works have attempted to build. Although Milwaukee has a population of 390,000, the taxicab idea has never been developed, while the regular motor livery has gained a good foothold.

COMMERCIAL CAR FOR REMOVING SNOW IN GERMANY

KANSAS CITY ESTABLISHMENT OF DEY MOTOR CAR CO., TEDDY DEY, MANAGER, HANDLING THE PIERCE-ARROW

Increases Stock—The Krueger Automobile Co., of Oshkosh, Wis., has increased its capital stock from $10,000 to $25,000.

Filling Its First Order—The F. Eggers Veneer Seating Co., of Two Rivers, Wis., one of the largest concerns of the kind in the world, is working on its first order for motor car dashes, bodies and coil boxes.

Duff Is Building—Ralph Duff, of Nebraska City, Neb., has let the contract for the erection of a 42 by 120-foot brick garage, which will be pushed to completion at once. The new garage when completed will be the home of the Overland.

Kells Company Moves—The W. J. Kells Mfg. Co. has removed from 62-64-66 Van Winkle avenue, Jersey City, N. J., to 726-28 Eleventh avenue, New York, near Fifty-second street, with its Kells honeycomb water coolers, mufflers, aluminum dashboards, hoods, coil radiators, mud guards, fans, gasoline, oil and water tanks, sheet metal aprons, etc.

Will Build Engines—The Wisconsin Motor Mfg. Co., of Milwaukee, has announced its plans for the newly incorporated business. The company will occupy the former Milwaukee Locomotive Co. works at North Milwaukee and will devote its entire attention at the start to building motors for motor cars, later also for motor boats. One type of engine will be built. It will be a four-cylinder motor. Thirty-five will be employed at once, and the capacity for the first year has been fixed at 500 motors. Actual work will start on April 1.

Franklin Employes' Fund—A membership of 1,000 is in prospect for the Franklin Mutual Benefit Society, an organization of employes of the H. H. Franklin Mfg. Co. at the latter's motor car factory in Syracuse. In the past few months there has been a growth of 300 members, making a total of 864. The organization is maintained by the payment of a small monthly fee, which will be cut in two in the near future when the surplus reaches $4,000 and will be automatically kept at the smaller figure as the surplus maintains that size. In case of either sickness or accident a member draws from the society's funds for a period of 26 weeks in case he or she is incapacitated for that length of time, and a payment of a stated sum is made in case of death. Membership is entirely voluntary.

Badger Concern Incorporates—Articles of incorporation have been filed at Madison, Wis., for the Badger Rubber Works, of Mineral Point, Wis. The capital stock is $100,000. Phil Allen, Jr., George Graham and John W. Moody are the incorporators.

Working Nights—The Chadwick Engineering Work, of Pottstown, Pa., is organizing a night shift. The demands for quick deliveries have become so insistent that the management has been compelled to make arrangements to run day and night for the next few months.

Building in Council Bluffs—Excavating for the single-story brick building on Fourth street, Council Bluffs, Ia., for the Atlantic Automobile Co., agent in southwestern Iowa for the Ford, Reo and Premier, was begun last week. According to the plans the building will be 47 by 100. The company will make its headquarters in Council Bluffs, retaining their quarters at Atlantic as a branch. Directly across the street the new brick building of the H. H. Van Brunt Co., distributer of the Overland and Pope-Hartford lines, is nearing completion.

Stops Garage Building—That one may not build a garage in the select residential sections of Hartford, Conn., is certain from the fact that William E. Kibbe, a local motorist, endeavored to erect a public garage at 321 Garden street. Judge John Coats, of the court of common pleas, issued an injunction restraining Mr. Kibbe from carrying out his plans. The motorist's house is located in what is known as the Homestead Park tract, and according to the conditions under which the party building lots are sold, no building except a one or two-family dwelling can be built. Some time ago Mr. Kibbe erected a small garage in the rear of his house and no objection was made to it; this he used for storing his own car and his neighbors regarded it as a necessity. But when he undertook the construction of a larger garage in which he intended to care for cars in general objection was at once raised by the park corporation and the injunction was applied for and granted.

Is Moline Agent—Robert Nash, of Grand Rapids, Wis., has been appointed district agent for the Moline in several counties in north central Wisconsin.

New Agency for Turner—W. Mason Turner, well known in Boston motor circles, has taken the agency of the American Simplex. He has the entire New England territory and has opened temporary quarters at 10 Columbus avenue.

New Spring Concern—The St. Louis Supplementary Spiral Spring Co., Inc., 202 Motor Mart building, Sixty -second street and Broadway, New York, is a new company formed to represent the Supplementary Spiral Spring Co. in New York.

Stromberg Branches Move—The Stromberg carbureter New York branch will remove on or about April 1 to the new Automobile building, at Sixty-fourth street and Broadway, where it will combine its office and installation department. The San Francisco branch office of the company has been removed from 426-28 Van Ness avenue to 307 Golden Gate avenue.

Eau Claire Gets Plants—The Eau Claire, Wis., Commercial Association is about to secure a new industry—the manufacture of gasoline motors and engines for cars and boats. H. J. Johnson plans to move to Eau Claire if the association will guarantee a 10 per cent royalty on the finished product. J. Herbert Johnson, of Milwaukee, brass founder and aluminum works, has agreed to establish his works in Eau Claire.

Economy Plant in Joliet—The Economy Motor Buggy Co. has moved from Fort Wayne, Ind., to Joliet, Ill., where it has taken possession of a new plant which was built by the company. Joliet was selected because of its excellent railroad facilities and its proximity to Chicago. John Lambert is president of the concern, J. F. Beuret vice-president and general manager, J. G. Flowers treasurer, J. H. Newport secretary and general sales manager and H. B. Olds mechanical engineer. The company, which has been manufacturing only

single-seat motor buggies in the past, intends adding two-seated rigs and business wagons to its line.

Building Big Garage—M. Stebbins, of Waukesha, Wis., is having a $12,000 garage and salesroom built at Belleview place and Downer avenue, Milwaukee, Wis. It will be 60 by 120 feet in dimensions.

Bankrupt's Assets Sold—The assets of the bankrupt Sterling Motor Car Co., of Binghamton, N. Y., were recently sold at auction. The sale is subject to confirmation by Referee in Bankruptcy Benjamin R. Baker.

Farewell Dinner for Plow—A farewell dinner was tendered to Henry Plow, secretary and treasurer of the Hartford Rubber Works Co., by the officers and department managers of the company at the Hotel Heublein Saturday evening.

Motor Buggy Makers Busy—The prospects for a record business in high-wheelers this year seem greater than ever before. The Holsman company is still running its factory day and night and reports it is behind on orders even at this late date.

Sold by a Ball Player—Monte Cross, the famous baseball player, has organized a company to sell Winton cars in Kansas City. Mr. Cross spent the winter at the Winton branch house in Philadelphia, familiarizing himself with the six-cylinder Winton.

McCue Company Moving—The McCue Co., builder of the McCue-Hartford car, is moving into its new factory building on Pliny street, Hartford, Conn. The company has been located for some years on Capitol avenue, and when the manufacture of cars was undertaken it was found necessary to build a new factory. The new factory is of brick, two stories in height.

Ducasse Given Darracq Agency—The exclusive agency of the Darracq car in America has been granted to Henry Ducasse & Co., of 140 West Forty-second street, New York city. By the terms of the agreement with the Darracqs the new agents will have the entire United States territory and not only handle the sales of regular touring cars and chassis, but also the large importations of Darracq taxicabs. Sub-agencies will be started in the large cities.

Moon Plant Busy—An increased demand upon the factory output of the Moon Motor Car Co. has made it necessary to increase the working force 15 per cent during the past week. The increase in the working force is partly the result of recent additions to the factory facilities. Several new pieces of machinery have just been installed, including a large special radial drill, cold slitting saw and a high-powered milling machine. A cylinder boring machine, which bores two cylinders simultaneously, has also been installed. It has a capacity of fifty cylinders a day. Because the plant has been unable to secure a sufficient number of the kind of skilled men required, it has been necessary to work overtime—at night and on Sunday.

Krieger in Business—Edward J. Krieger will open a garage at West Bend, Wis., about April 15. Part of the building will be devoted to a plant for the Meyer Brothers Gas Engine Works, which will care for all repairs.

New in Milwaukee—The Auburn Motor Garage 266-268 Twenty-seventh street, Milwaukeee, Wis., will be opened on April 15. H. F. Melius is proprietor. Temporary quarters for the Auburn line have been established at 650 Thirty-fifth street.

Oxley Given a Line—M. H. Oxley has just been given the Indiana agency for the line of motor cars manufactured by the Enger Buggy Co., of Cincinnati. He is preparing to open an office and sales room in the I. O. K. of P. building in Indianapolis.

Chicago Dealers' Choices—The annual election of the Chicago Automobile Trade Association resulted in a victory for the members' party, which put into office all its candidates with the exception of one, the successful slate being made up as follows: President, Thomas J. Hay; vice-president, Joseph F. Gunther; secretary, F. E. Sparks; treasurer, Henry Paulman; directors, N. H. Van Sicklen, A. J. Banta and H. P. Branstetter.

Hoosiers Improve Plant—Extensive improvements have been completed by the Buick-Losey Co., Indianapolis. The front of the three-story building in East New York street has been replaced by a plate glass front, with facilities for displaying cars in windows on each floor. A sundry department has just been added which has been placed in the charge of C. L. Payne, until recently with the Gibson Automobile Co. J. F. Minthorne has taken charge of the city sales department.

Record for Pence—A remarkable record was established the past week by the Pence Auto Co., of Minneapolis. A train of thirty-two cars was received on Wednesday, and other shipments just before and just after the arrival of this big shipment brought the total of cars received up to forty-eight cars in the space of 48 hours. Each car contained three machines. This, figured down still further, means that a car was received every 20 minutes by the Pence company for 48 hours on a stretch.

Deright Sells Out—J. J. Deright has disposed of all his interests in the Deright Automobile Co., one of the biggest concerns in Omaha, Neb., and has taken the agency for the Locomobile and Matheson cars. The Deright Automobile Co. has held the agency for a large number of cars, including the Velie, Stoddard-Dayton, Ford, Waverley, Raunch & Lang, and several others. The garage is one of the finest in the west, but who will be the new proprietors is not known. Mr. Deright is spending a week or 10 days in New York completing the contracts for the new agency. Mr. Deright is president of the Omaha Automobile Show Association.

Minneapolis Show Attendance—During the week of the Minneapolis show there were 66,607 people who went through the turnstiles at the entrances. This showing is far in excess of that anticipated by the management.

Taxi Service for Toronto—The new taxicab company of Toronto, Can., has ordered Darracqs. These cars are being rushed to the Canadian city so that the taxicab service may be started not later than the first week in April.

Take the Oakland—The Omaha agency for the Oakland has been taken by McIntyre & Wallace, formerly known as the firm of William H. Wallace. Mr. McIntyre, the new member of the firm, becomes the senior partner by the change.

Lozier Agents Active—Willard V. B. Campbell, of Horicon, Wis., recently appointed state agent for the Lozier cars, has established the Lozier headquarters for the state at Farwell avenue and Brady street, Milwaukee, Wis. S. G. Rayl has been appointed distributor of the Lozier line of cars for northern California, with headquarters at San Francisco. A temporary salesroom has been opened at the Broadway garage.

Through With Horses—The first Indiana wholesale dry goods concern to replace horses with a motor car delivery, is Hibben, Hollweg & Co., of Indianapolis. This company has just received a large truck and delivery wagon, both of Rapid make. All of their horses have been sold and the city delivery and freight depot work will be done exclusively with motor cars in the future. The cars were sold through the Indianapolis Motor Car Co.

Will Use Rapids—The Marquette County Traction Co. has been formed at Marquette, Mich., to operate a motor traction service between Marquette, Negaunee, Ishpeming, Presque Isle, Upper Peninsula State Prison, Cleveland Cliff Heights, Teal Lake and other points of interest for tourists, hay fever sufferers and summer visitors. Four Rapid Pullman trucks have been purchased. A similar service will be instituted in the copper country, with headquarters at Houghton, if the Marquette line is found successful.

Rambler for Y. M. C. A. Use—The Rambler Garage Co., of Milwaukee, has loaned a touring car to the Central Y. M. C. A. in Milwaukee for the use of the new classes in motorology. The big car is taken down and assembled about once a week under the direction of engineers, who have voluntarily given their services. Al Reeke, former secretary and treasurer of the Solliday Motor Car Co., now the Stephenson Motor Car Co., and F. F. Templeton, of Denver, Colo., have joined the sales forces of the Rambler Garage Co., of Milwaukee.

Brief Business Announcements

Clyde, O.—W. E. Fisher has taken the Maxwell for Wayne county.

Kansas City, Mo.—The Ettwein Motor Car Co., of 3701 Main street, has been appointed agent in this city for the Crawford car.

Springfield, Ill.—The Illinois Automobile Co. has been appointed selling agent for the Moline for Springfield and Sangamon county.

Kansas City, Mo.—The local branch of the Fisk Rubber Co. has removed to larger and more convenient quarters at 1604 Grand avenue.

Newark, N. J.—A. G. Spalding & Brother are to establish a local branch in this city and have leased a building at Halsey street and Branford place.

Spirit Lake, Ia.—A. Hurd and John W. Hartman have opened a garage and machine shop here and have secured the agency for the Overland and Reo.

LaCrosse, Wis.—Frank X. Dietz, now with the Welch Brothers Motor Car Co., of Milwaukee, will open a repair shop and garage at 121 West avenue in this city.

Menasha, Wis.—W. L. Wheeler has been appointed agent for the Chalmers-Detroit line in this city and vicinity under charge of W. L. Hibbard Motor Car Co., state agent, Milwaukee, Wis.

Pittsburg, Pa.—Ground has been broken for the new garage of the Buick company at Baum street and Euclid avenue, east end. It will be four stories high and will be completed by July 1.

Salt Lake City, Utah—The Tom Botterill Automobile Co. has moved into its new garage and showroom at 36-42 State street, where the Pierce-Arrow, Stevens-Duryea, Pope-Hartford and Chalmers-Detroit will be shown.

Baltimore, Md.—Dixon C. Walker is preparing to erect a one-story garage on North Charles street between North avenue and Twentieth street. The building is to be used as headquarters for the Studebaker company.

Milwaukee, Wis.—The Schwartzburg-Bond Auto Co. has filed an amendment to its articles of incorporation changing the name to Bond Auto Sales Co. Edward Schwartzburg retires to enter the field of motor manufacturing in Milwaukee.

Green Bay, Wis.—Gotfredson Brothers, who recently opened a garage and salesroom in connection with the wholesale hardware business, have followed the example of the Hokanson Automobile Co., of Madison, Wis., in the matter of sub-agencies. The firm is now making appointments in Kewaunee, Sturgeon Bay, Marinette, all live cities in northeastern Wisconsin. Gotfredson Brothers handle the Maxwell in this territory.

Portland, Ore.—The H. L. Keats Co. has been appointed state distributors for Lozier cars.

Morristown, N. J.—The Mendham Garage Co. is to start a motor bus line between Mendham and Morristown.

Fond du Lac, Wis.—The Longdin & Bruegger Co., manufacturer of tops, dashes and leather goods for motor cars, has commenced work on an addition to its factory at Second and Macy streets.

Des Moines, Ia.—T. E. Dyson & Son is is the name of a new firm which has been appointed local agent for the Oakland car. The concern has taken a lease of the property at 507-509 Fifth street.

Kansas City, Mo.—The Hollister Motor Car Co., of 209 Bank of Commerce building, has been appointed agent for the Smith car. This is the first time that the Smith has maintained an agency here.

Cleveland, O.—Herbert Wright, formerly of the brokerage firm of Herbert Wright & Co., has sold his business, and in the future will be in charge of the Ohio business of the Babcock Electric Carriage Co., of Buffalo. In the future the company will do business in this state under the name of the Babcock Electric Garage and Sales Co.

RECENT INCORPORATIONS

Taunton, Mass—Taunton Taxicab Co., capital stock, $2,000, to do a general motor car hire business; incorporators, W. E. Rose, Harry Cardow and Frank B. Mason.

New York—Wiseley & Everley Co., capital stock $10,000, to repair trucks, wagons, motor cars, etc.; incorporators, Benjamin Wisley, William Everley and W. B. Bascom.

New York—Rainier Motor Co., capital stock $350,000, to manufacture power-propelled vehicles; incorporators, Paul N. Lineberger, G. C. Comstock and Frederick H. Van Houten.

Los Angeles, Cal.—Pioneer Automobile Exchange, capital stock $25,000; incorporators, J. W. Mitchell, F. E. Edwards, H. F. Duck and R. E. Moir.

New York—Motor Contest Association of New York City, capital stock $5,000, to deal in real estate, conduct races, motors, boats and airships; incorporators, W. J. Morgan, F. D. Stidham and H. L. Harrison.

Stapleton, N. Y.—Richmond Taximeter Co., capital stock $5,000, to manufacture and operate cars, carriages, cabs, and trucks; incorporators, Maurice Carr, Julia V. Simons and Frederick Spencer.

New York—Connecticut Motor Vehicle Co., capital stock $50,000, to manufacture motors, engines and machinery; incorporators, C. M. Gilpin, H. C. Murray and H. A. Shuart.

Detroit, Mich.—Brush-Detroit Motor Co., capital stock $11,000, to act as agent for the Brush runabout; incorporators, Frank Briscoe, E. Moessner and Paul McKinney.

Louisville, Ky.—Weber Auto-Truck Mfg. Co., capital stock $10,000; incorporators, Frank and E. J. Weber and J. L. McBurney.

New York—Hubbell Garage Co., capital stock $5,000, to deal in motor cars and operate a garage; incorporators, Ira Ollenburg, R. C. Birkhahn, Madeline Lynch

Trenton, N. J.—The Adams Electric Co. has opened its new garage at 237 East State street.

Philadelphia, Pa.—Frank W. Clement, formerly with the Diamond Rubber Co., has joined the sales force of the Standard Rubber Tire Co.

Philadelphia, Pa. — Application will shortly be made for a charter for a new corporation to be known as the Philadelphia Auto School Co.

Wichita, Kan.—The Wichita Automobile Co. has secured the agency for the Premier. The jurisdiction of the firm will extend over southern Kansas.

Kearney, Neb.—Patterson & Wingard have purchased the business of R. D. Mann and will conduct it from now on. They have also taken the agency for the Velie.

Des Moines, Ia.—The Strong Automobile Co. is about to erect a new garage at Ninth and Grand streets. The Ideal Auto Co., which is building a new garage at Eighth and Grand streets, expects to be settled in its new quarters by May 1.

Pittsburg, Pa.—W. Murray Carr, formerly with the Standard Auto Co., has purchased a controlling interest in the Hamilton Auto Co. and has been elected president of the company. The company has the agency for the Middleby and the Kisselkar.

Hartford, Conn.—T. Midgley, of this city, has assigned to the Hartford Rubber Works Co. a patent for a vehicle wheel. D. J. F. Slager, of New Haven, has assigned to the New Haven Clock Co. a patent for a fastening device for motor car clocks.

Bristol, Conn.—The Bristol Engineering Co., which has been occupying quarters in the plant of the New Departure Mfg. Co. and the C. G. Garrigus Machine Co., has leased the old factory of the J. H. Sessions Son, and will move in as soon as the alterations are completed.

Norwich, Conn.—The Connecticut Gauge Co., which is to manufacture a special speed indicator to be known as the velocimeter, has been formally organized with the following officers; President and treasurer, Arthur D. Wilcox, who is the inventor of the device; secretary, Joseph D. Harris.

Pittsburg, Pa.—The Hamilton Automobile Co. has started work on a two-story garage, 75 feet square, on Hamilton and Dallas avenues, east end. W. Murray Carr, who served several years with the Standard Automobile Co., is president of the Hamilton company, which will handle the Kisselkar and the Middleby cars.